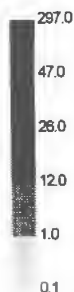
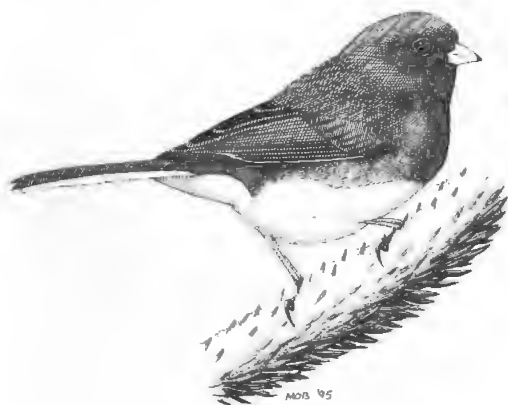


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Cover: Distribution of Dark-eyed Junco. Drawing by Michael O'Brien.



DISTRIBUTION AND ABUNDANCE OF BIRDS WINTERING IN MARYLAND, 1988 - 1993

**JEFF S. HATFIELD¹, SUE A. RICCIARDI², GREG A. GOUGH¹,
DANNY BYSTRAK³, SAM DROEGE¹, AND CHANDLER S. ROBBINS¹**

*¹National Biological Service, Patuxent Wildlife
Research Center, Laurel, Maryland 20708*

²1132 Ferber Avenue, Arnold, Maryland 21012

³6400 Mallard Lane, Lothian, Maryland 20711

Abstract

A winter bird survey was conducted throughout Maryland, primarily by volunteers, during the 6 winters of 1988 to 1993 between the dates 10 Jan and 10 Feb. The state of Maryland is covered by 1231 blocks (9.5 sq. miles each), each comprising one-sixth of the standard U.S.G.S. 7.5 minute topographic quadrangle, and 548 of these blocks (44.5%) were surveyed for winter birds. Blocks were chosen in a systematic pattern with eventually almost every other block in the state having been surveyed as of Feb, 1993. Volunteers conducted each 4-hour survey by walking a 4-6 mile route chosen by the volunteer to sample habitats in proportion to their availability in the block. Surveys began around sunrise (~7:30 a.m.) and all birds seen or heard during the 4 hours were recorded on data sheets. The data were then used to create maps representing the distribution and relative abundance of each species of wintering bird found in at least 10 blocks in the state.

Introduction

The current Maryland winter bird survey had its origin in the early 1970s when Chandler S. Robbins and Danny Bystrak coordinated a small-scale project in central Maryland (Robbins 1970, 1971). The survey was designed as a monitoring program for winter resident birds, but proved to be valuable as an inventorying method, producing fine-scale relative abundance maps (Bystrak and Robbins 1972). Additionally, Bystrak and Robbins (1972) found interesting year-to-year variation in abundance of species not commonly thought to be irruptive. The project was intended only as a pilot study and was discontinued after 5 years.

Wanting to see the concept tried on a larger scale and to compare results to the Audubon Christmas Bird Count data, Bystrak, Sam Droege, Robert F. Ringler, and Eirik A.T. Blom designed the current winter bird survey. The plan was to devote 6 years to a survey similar to the earlier, more limited one, but to survey 3 blocks per quadrangle, if possible, instead of just 1 block over the 6 years. To minimize the impact of annual variability in abundances, target blocks were designated each year in a pattern extending from south to north in each quadrangle. The blocks in the bottom third of each quadrangle were targeted in the first and fourth years, the middle third in the second and fifth years, and the top third in the third and sixth years. The resulting coverage was a systematic sample of blocks in a checkerboard pattern with the annual mean geographic locations approximately the same. Ultimately, the numbers of blocks surveyed each year were 96, 89, 94, 73, 72, and 124 for the 6 years, respectively, totaling 548 blocks. Fig. 1a shows the blocks sampled along with the standard physiographic regions of Maryland, following Stewart and Robbins (1958).

Sue A. Ricciardi served as the coordinator, in charge of organizing volunteers each year to run the targeted blocks. Volunteers were screened for ability to identify winter birds and were sent materials for conducting the survey. The standard guidelines and forms used by the volunteers are included in an Appendix. Once a block was assigned, it was the volunteer's responsibility to set up the 4-6 mile walking route such that it would sample habitats in proportion to their availability, if possible, within the block. Surveys were conducted between 10 Jan and 10 Feb, from approximately 7:30 to 11:30 a.m. Birds were recorded on each survey in 8 30-minute periods to give a measure of frequency as well as abundance. Volunteers used standard field and summary forms and returned the completed forms, along with a sketch of the route, to the coordinator. Then the data were subjected to rigorous quality control and entered into a computer data file for analyses.

Data Analyses

Summary statistics were tabulated for each species. These included the percent of blocks in which each species was detected, the mean abundance in blocks where each species was detected (i.e., occupied blocks), and the mean abundance over all 548 blocks, including blocks where the species was not detected (counted as 0 in the overall means). Species found in 10 or more blocks were ranked using each of these 3 statistics for comparison of the relative abundance among species. Rarer species were not ranked because of imprecision in rankings of such species.

Due to the survey design, it was not possible to statistically control for differences in the volunteers' abilities (e.g., some people are probably better birders than others) and thus all maps and summary statistics are conditional upon assuming no observer effects. Other sources of bias in this survey also exist. For example, some habitats may not have been sampled well because they were less accessible by road (e.g., marshes with poor road access) and this may have caused some species to have lower detectability or spotty distributions (e.g., Swamp Sparrow). Weather also may have affected the results (e.g., open bodies of water on a given block may have been ice-covered during the actual count). Furthermore, all results apply only to the 6 years of this survey and no attempt is made in this paper to account for yearly differences in abundances of species.

Another publication (Hatfield et al., In Prep.) will investigate yearly variability in abundance of each species, compare the winter bird survey to Audubon Christmas Bird Count data collected near sampled blocks around the same period, and evaluate the

winter bird survey by comparing within-block versus between-block variability in counts of each species on a subset of 22 blocks sampled repeatedly during 2 winters (1992, 1993). Only 1 survey, chosen at random from each repeated block, was included in the analyses for the current study.

Maps

Two maps were produced for each species found in at least 10 blocks during the 6 years of the survey. The first map (designated "a") for each species, the dot map, has a black dot in each surveyed block where it was found, with the area of the dot proportional to the size of the count obtained during the 4-hour survey. The areas of the dots on each map were scaled between the smallest and largest count and a small "o" was placed in each surveyed block where a count of 0 was obtained (i.e., block was sampled but no birds of that species were found on that survey). Therefore, the dot maps present the actual data with no statistical smoothing between blocks. Map Viewer Software Version 1.1 (Golden Software, Golden, Colorado) was used to create these dot maps.

The second map (designated "b") of each pair of species' maps is the contour map. These maps were produced using Surfer Software Version 5.01 (Golden Software, Golden, Colorado) with a statistical procedure called kriging (Isaaks and Srivastava 1989) and thus represent a statistically smoothed version of the data. In kriging, a grid is superimposed on the state and a linear model is calculated that estimates the count at any grid point as a weighted average of nearby points where data were collected. The counts from (at most) the 9 closest blocks within about 2 block-widths around each grid point were used in the calculations. This was necessary due to the irregular shape of Maryland, especially the narrow part of the panhandle between Allegany and Washington counties, but sometimes resulted in a blotchy effect for the contour maps of less abundant species. For contour maps that appear particularly blotchy, the dot map may be easier to interpret.

For the reader interested in more technical detail, kriging was used because it is a smoothing procedure that incorporates the autocorrelation structure among the blocks. The kriging was performed over a 200-unit grid assuming a Gaussian variogram estimated separately for each species. The weights were a function of distance, estimated using the variogram, which measures the spatial association among blocks as a function of the distance between them (Isaaks and Srivastava 1989).

Contour intervals for each species were chosen such that the largest contour was the maximum count over all the 4-hour surveys. The next three contours for most species were the 75th, 50th (median), and 25th percentiles of the nonzero counts of these species. To illustrate, see the contour scale for Turkey Vulture (Fig. 19b). Seventy-five percent of the surveys of blocks where Turkey Vultures were detected resulted in counts ranging from 1 to 12 birds and 25% found from 12 to 157 birds. The median count was 6 birds and the count of 3 was the 25th percentile. For some species, however, some of the percentiles were the same and therefore these species have fewer than 4 contour intervals. The 0.1 contour interval subdivision present on some maps was chosen arbitrarily to represent a very low density of birds (i.e., 1 bird detected in 10 4-hour surveys).

Description of Maryland

For the purpose of interpreting the maps, a brief discussion of the geography of the state and its physiographic regions (see Fig. 1a) follows. Maryland contains parts of 3 physiographic provinces (Frese 1994): Coastal Plain, Piedmont, and Appalachian. Elevations increase from sea level to 3360 feet, generally in an east-west progression. The Coastal Plain, part of the Atlantic Coastal Plain, is further divided on the map into the Upper Chesapeake, Eastern Shore, and Western Shore sections bordering the Chesapeake Bay. Elevations there are mostly less than 100 feet, with the topography low and flat except for the hilly country of the lower Western Shore. Major rivers are the Patuxent, Potomac, Chester, Choptank, Nanticoke, and Pocomoke, all of which drain into the Chesapeake Bay. Agriculture predominates, with much of the land cleared for soybeans, corn, wheat, hay, and on the lower Western Shore, tobacco.

The Piedmont province is sandwiched between the fall line for streams and the eastern beginnings of the Catoctin mountains. The land is rolling and hilly, ranging in elevation from about 100 to 800 feet, and is drained mostly by the Potomac, Monocacy, Patapsco, Gunpowder, and Susquehanna rivers. Straddling the boundary between Coastal Plain and Piedmont are the heavily urbanized areas of Baltimore, Maryland, and Washington, D.C., both of which are surrounded by extensive suburban development that reaches far into both provinces.

The Appalachian Province is composed of the Ridge and Valley and the Allegheny Mountain sections. The former section is characterized by ridges and steep mountains running northeast to southwest separated by mostly narrow valleys, with elevations in the 500 to 2000 feet range. The heavily forested Allegheny Mountain section is part of the Allegheny Plateau and contains the state's highest elevations, mostly in the range of 2000 to 3000 feet.

Less than half of the land surface in the state is forested, with oak and hickory predominating, although Loblolly Pine prevails on the Eastern Shore. Mean annual snowfall accumulations range from about 100 inches in extreme western Maryland to 10 inches on the Eastern Shore. January is the coldest month, and mean temperatures for January and February range between the upper 20's and upper 30's degrees Fahrenheit.

Results and Discussion

A total of 147 species was detected in the 548 blocks during the survey, with 98 species found in 10 or more blocks. Fig. 1a shows the blocks that were sampled during the survey along with the physiographic regions of Maryland. Fig. 1b shows a contour map for the total number of species detected per block along with summary statistics. Table 1 presents the summary statistics for the 49 species found on fewer than 10 blocks. The order of the species in Table 1, as well as the order of the maps, is by taxonomic sequence (AOU 1983). This publication was used to determine the standard common name of each species and should also be consulted for scientific names.

Figs. 2a-102a are the dot maps for the 98 species found on 10 or more blocks, plus 3 maps of species groups of gulls and crows. Summary statistics also are shown on the dot maps. The units for the scales on all maps, and for the mean relative abundances, are the number of birds counted during a 4-hour walking survey. Figs. 2b-102b are the contour maps for each species or species group, and their captions provide comments

concerning the distributions and relative abundances. A map of the counties of Maryland is shown on the inside back cover.

Care should be taken not to over-interpret the edges of the contour divisions on the kriged maps. The edges of boundaries often look "busy" with lots of "squiggles" which should be ignored for the most part. This is due to a choice made in applying the software (e.g., 200-unit grid) to make the resulting surface follow the outline of blocks, representing the true area surveyed. Thus, the dot maps should be compared to the contour maps for questionable abundance contours on the contour maps. The dot and contour maps each describe the data from a different perspective and, generally, either the dot map or the contour map is better for any given species, but it will be left to the reader to decide which map is preferred for each species. However, any contour map with an asterisk (*) following the figure number indicates that this map was particularly uninformative, usually because the species was difficult to detect and was missed in parts of its range.

Acknowledgments

We gratefully acknowledge all the volunteers below who conducted the counts. Volunteers with an asterisk following the name surveyed 10 or more blocks. Volunteers: Ted Banvard, Polly Batchelder, Chris Beaton*, Judy Blake, Rick Blom, Larry Bonham, Bob Boxwell, Jim Boxwell, Michael Braun, Dave Brinker, Carol Broderick, Danny Bystrak*, Paul Bystrak, John Canoles, Jim Cheevers, Marty Chestem, John Chrisafis, Roger Clapp, Les Coble, Patty Craig, Jean Crump, Jon G. Cupp, Lynn Davidson, Deanna Dawson*, Alan Dixon, Bob Dixon, Kevin Dodge, Sam Droege*, Chuck Dupree, Tad Eareckson, Les Eastman, Jeff Effinger, Gerald Elgert, Fred Fallon*, Jane Fallon, Rick Farrar, Jane Farrell, Rob Fleischer, Harold Fogleman, Robert Folker, Mark Garland, Carol Ghebelian, Rob Gibbs, Caleb Gordon, Greg Gough*, Russ Greenberg, Alex Hammer, Helene Hammer, Peter Hanan, Allan Hauray, Jeff Hatfield, Mark Hoffman, David Holmes, Marshall Howe, Bill Howe, Clark Jeschke, Emily Joyce, Paul Jung, Hank Kaestner*, Robert Keedy, Dennis Kirkwood, Wayne Klockner, Bryan Knedler, Henry Leskinen, Lloyd Lewis, Doug Lister, Gail Mackiernan, Carol McCollough, Lee McCollough, Joan McKearnan, Don Merritt, Stauffer Miller, Gene Morton, Dave Mozurkewich, Harvey Mudd*, Marion Mudd*, Floyd Murdoch, Jay Nelson, Michael O'Brien*, Paul O'Brien, Rob Peeples, Bruce Peterjohn, Lisa Petit, Kyle Rambo, Jan Reese, Sue Ricciardi*, Robert Ringler*, Chan Robbins, Brian Rollfinke, Gene Sattler, Cynthia Sibrel, Teresa Simons, Connie Skipper, Ann Smith, David Smith, Joanne Solem, David Spector, Jim Stasz, Chris Swarth, Byron Swift, Charles Swift, Bill Thompson, Spike Updegrave, Brad Vaughn, Charles Vaughn, June Vaughn, David Wallace, Peter Webb*, Steve Westre, Claudia Wilds, Jim Wilkinson, Levin Willey, George Wilmot*, and Erika Wilson.

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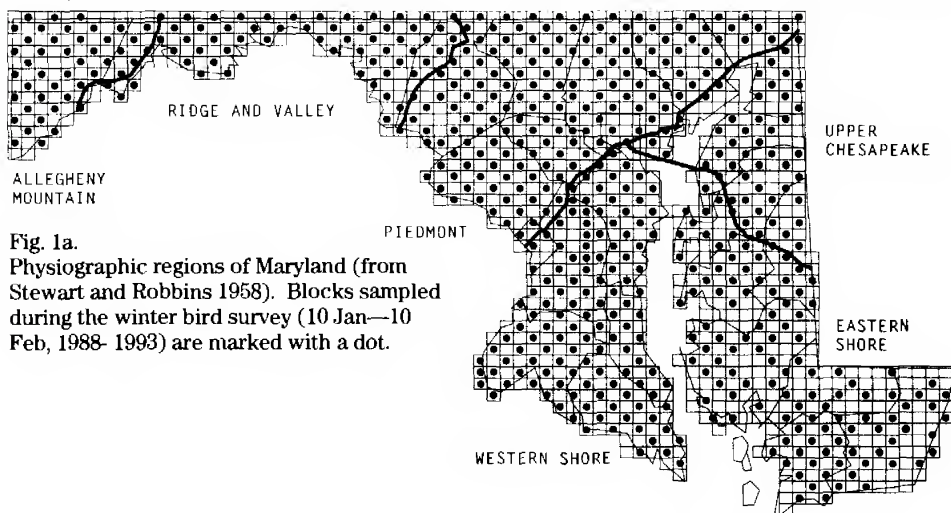


Fig. 1a.

Physiographic regions of Maryland (from Stewart and Robbins 1958). Blocks sampled during the winter bird survey (10 Jan–10 Feb, 1988–1993) are marked with a dot.

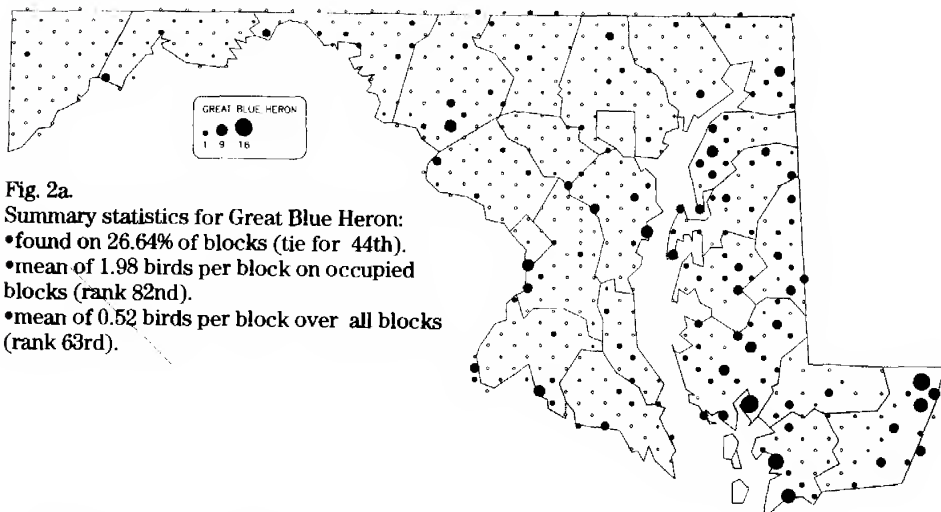


Fig. 2a.

Summary statistics for Great Blue Heron:

- found on 26.64% of blocks (tie for 44th).
- mean of 1.98 birds per block on occupied blocks (rank 82nd).
- mean of 0.52 birds per block over all blocks (rank 63rd).

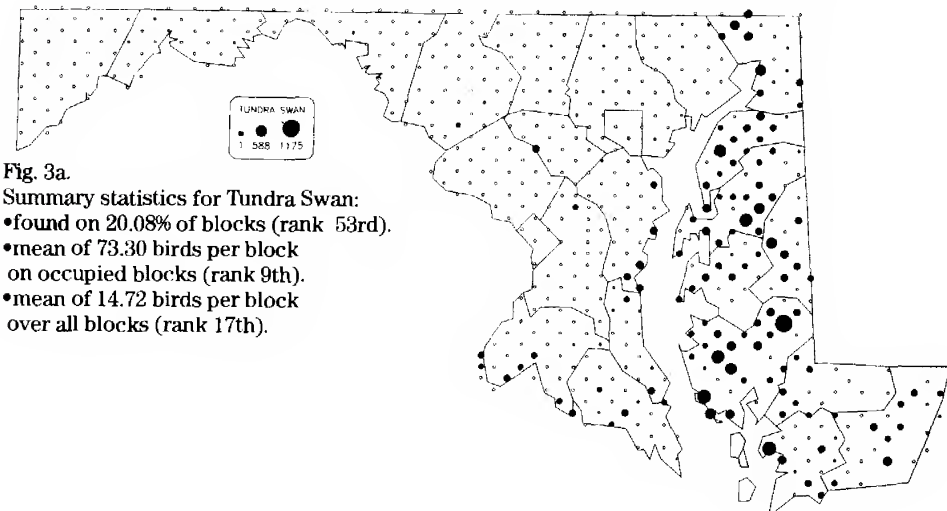


Fig. 3a.

Summary statistics for Tundra Swan:

- found on 20.08% of blocks (rank 53rd).
- mean of 73.30 birds per block on occupied blocks (rank 9th).
- mean of 14.72 birds per block over all blocks (rank 17th).

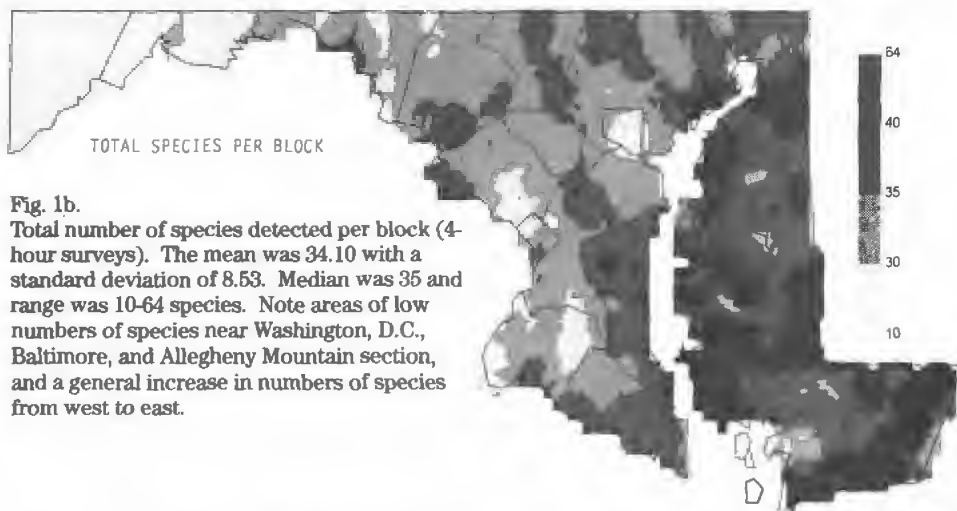


Fig. 1b.

Total number of species detected per block (4-hour surveys). The mean was 34.10 with a standard deviation of 8.53. Median was 35 and range was 10–64 species. Note areas of low numbers of species near Washington, D.C., Baltimore, and Allegheny Mountain section, and a general increase in numbers of species from west to east.

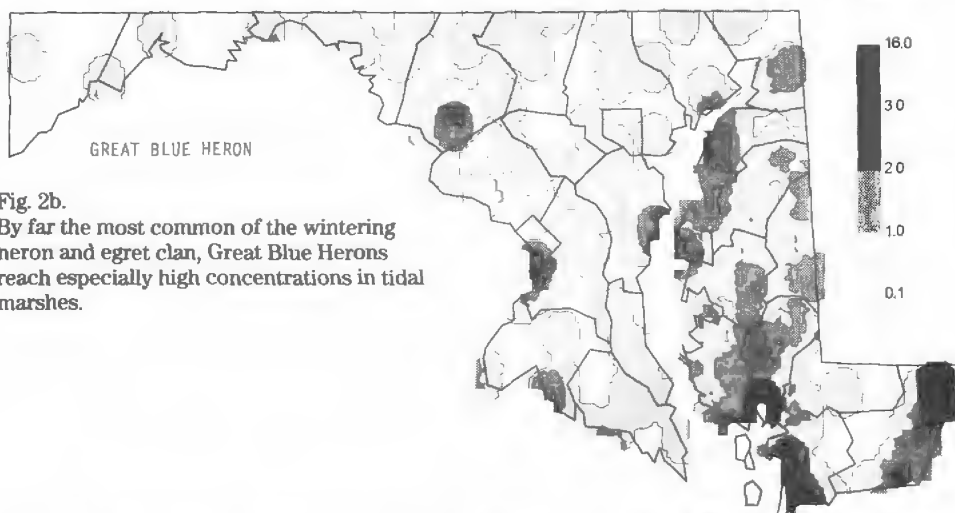


Fig. 2b.

By far the most common of the wintering heron and egret clan, Great Blue Herons reach especially high concentrations in tidal marshes.

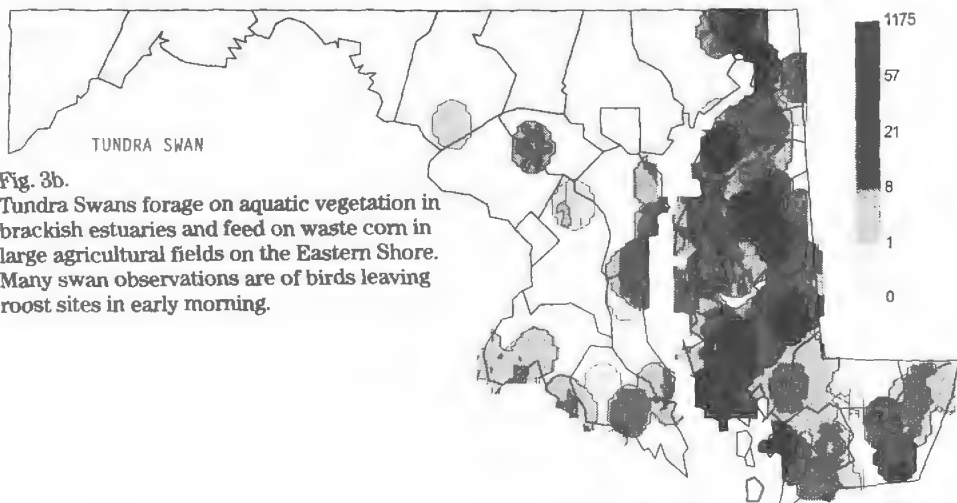


Fig. 3b.

Tundra Swans forage on aquatic vegetation in brackish estuaries and feed on waste corn in large agricultural fields on the Eastern Shore. Many swan observations are of birds leaving roost sites in early morning.

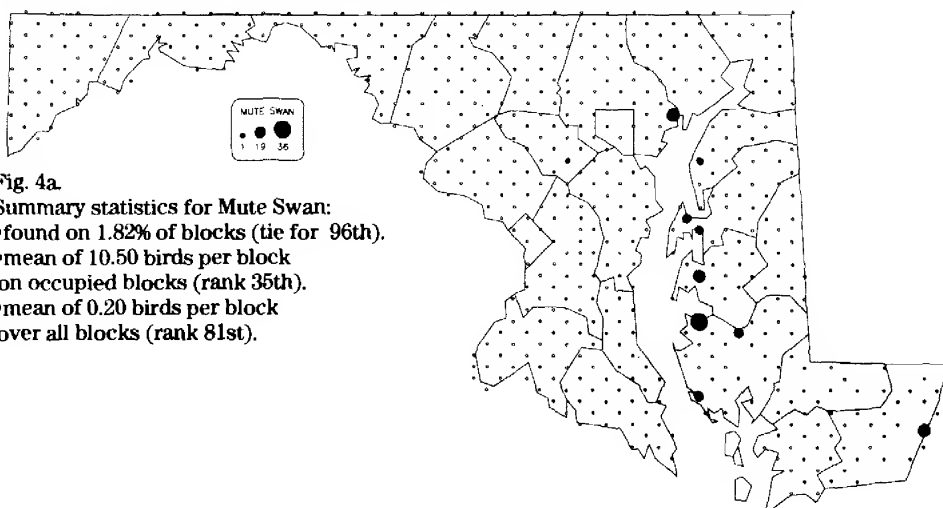


Fig. 4a.

Summary statistics for Mute Swan:

- found on 1.82% of blocks (tie for 96th).
- mean of 10.50 birds per block on occupied blocks (rank 35th).
- mean of 0.20 birds per block over all blocks (rank 81st).

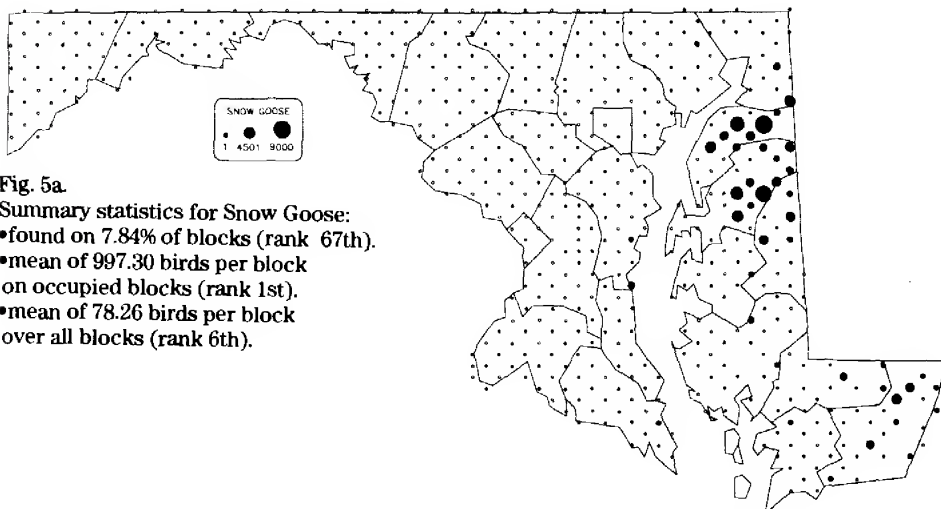


Fig. 5a.

Summary statistics for Snow Goose:

- found on 7.84% of blocks (rank 67th).
- mean of 997.30 birds per block on occupied blocks (rank 1st).
- mean of 78.26 birds per block over all blocks (rank 6th).

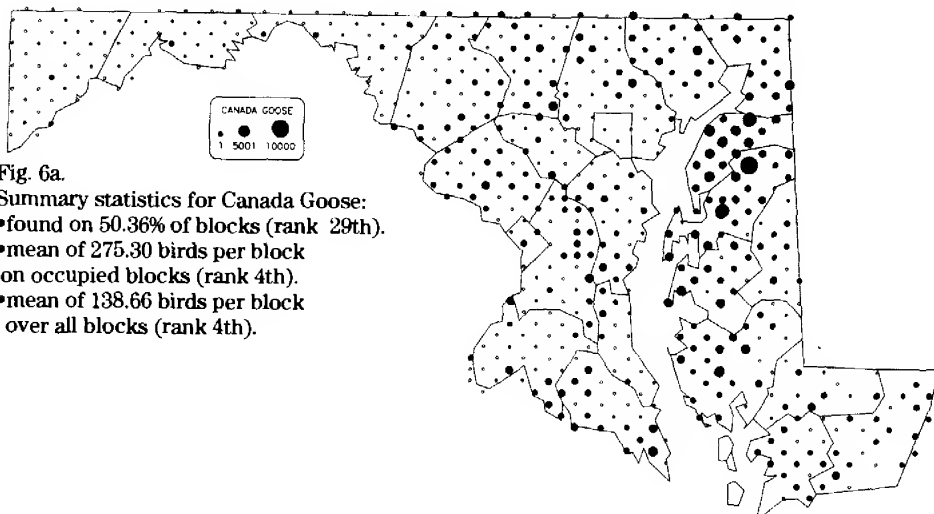


Fig. 6a.

Summary statistics for Canada Goose:

- found on 50.36% of blocks (rank 29th).
- mean of 275.30 birds per block on occupied blocks (rank 4th).
- mean of 138.66 birds per block over all blocks (rank 4th).

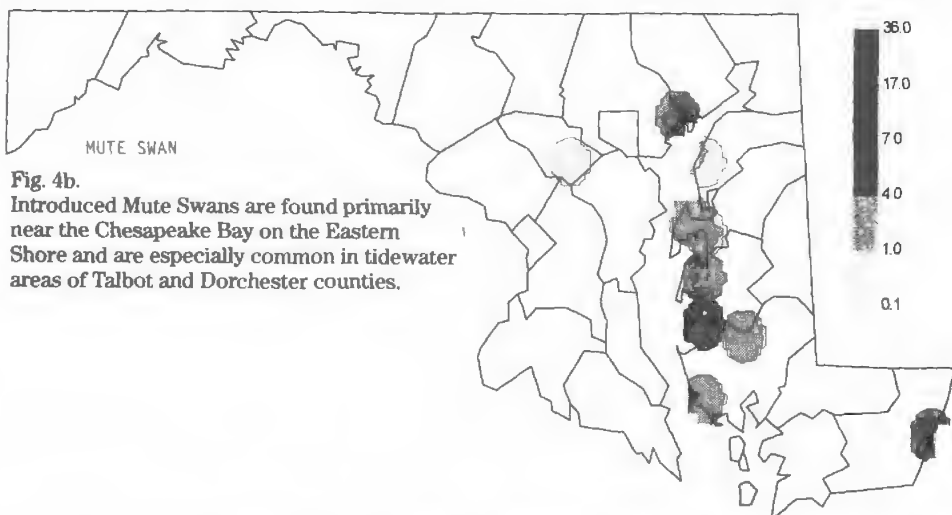


Fig. 4b.
Introduced Mute Swans are found primarily near the Chesapeake Bay on the Eastern Shore and are especially common in tidewater areas of Talbot and Dorchester counties.

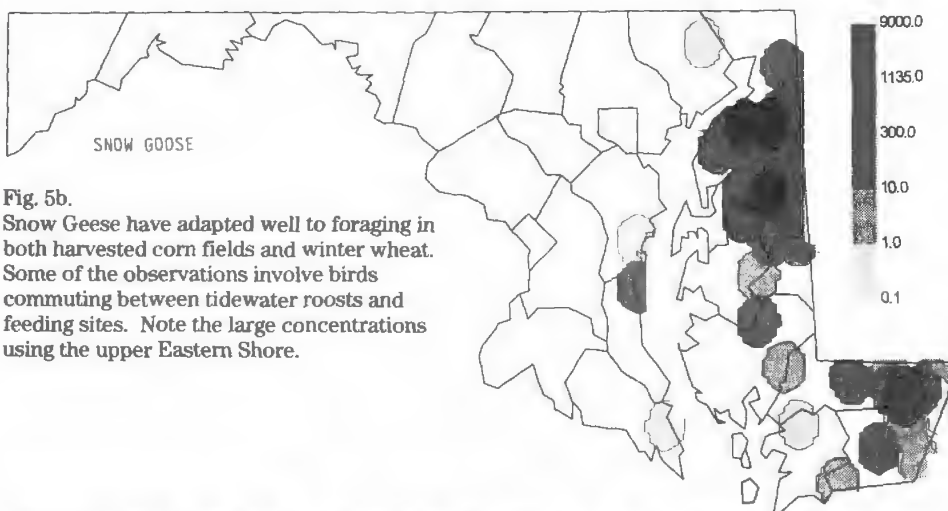


Fig. 5b.
Snow Geese have adapted well to foraging in both harvested corn fields and winter wheat. Some of the observations involve birds commuting between tidewater roosts and feeding sites. Note the large concentrations using the upper Eastern Shore.

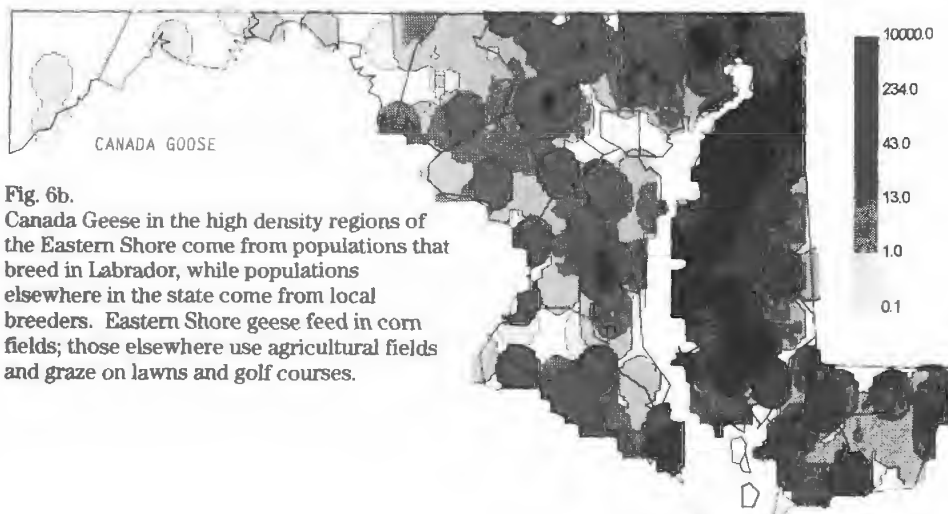


Fig. 6b.
Canada Geese in the high density regions of the Eastern Shore come from populations that breed in Labrador, while populations elsewhere in the state come from local breeders. Eastern Shore geese feed in corn fields; those elsewhere use agricultural fields and graze on lawns and golf courses.

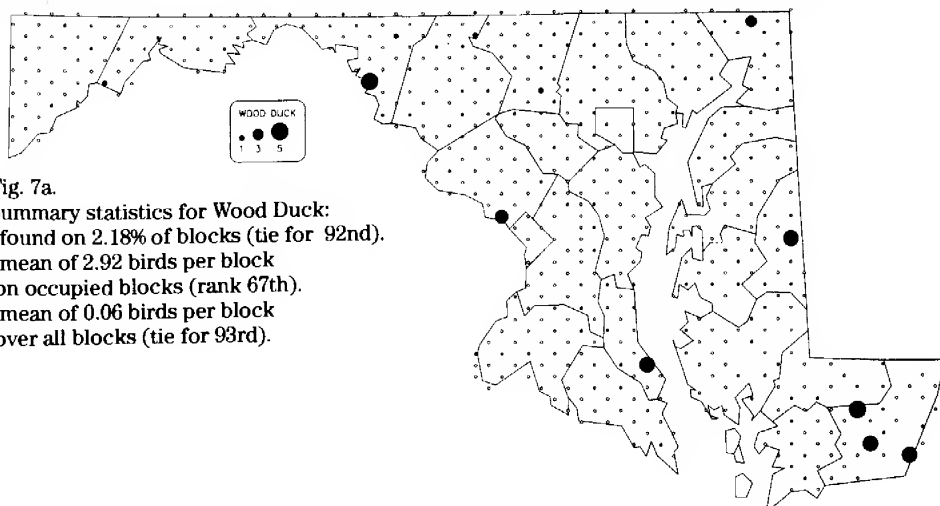


Fig. 7a.

Summary statistics for Wood Duck:

- found on 2.18% of blocks (tie for 92nd).
- mean of 2.92 birds per block on occupied blocks (rank 67th).
- mean of 0.06 birds per block over all blocks (tie for 93rd).

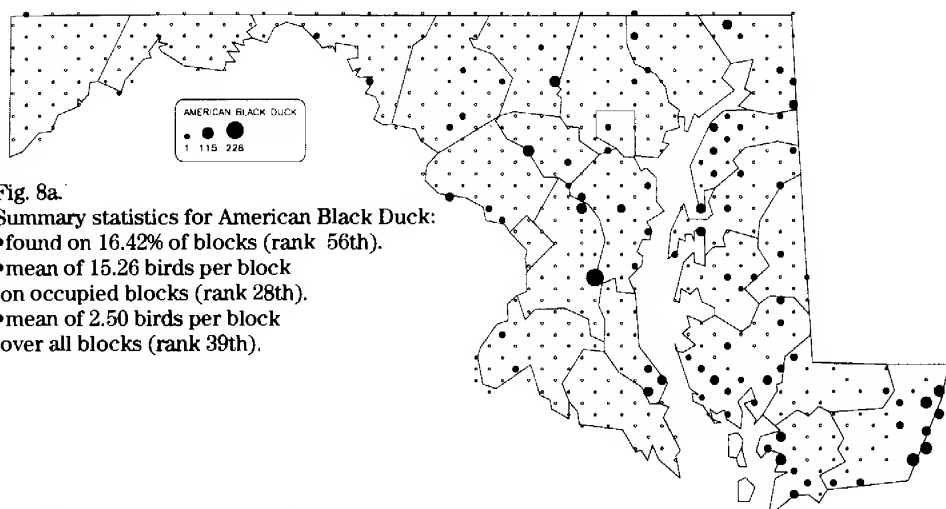


Fig. 8a.

Summary statistics for American Black Duck:

- found on 16.42% of blocks (rank 56th).
- mean of 15.26 birds per block on occupied blocks (rank 28th).
- mean of 2.50 birds per block over all blocks (rank 39th).

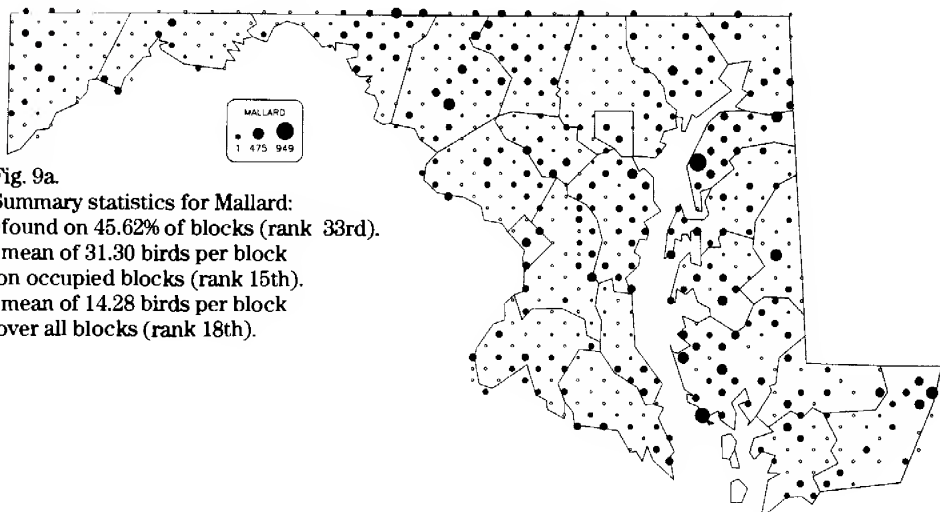


Fig. 9a.

Summary statistics for Mallard:

- found on 45.62% of blocks (rank 33rd).
- mean of 31.30 birds per block on occupied blocks (rank 15th).
- mean of 14.28 birds per block over all blocks (rank 18th).

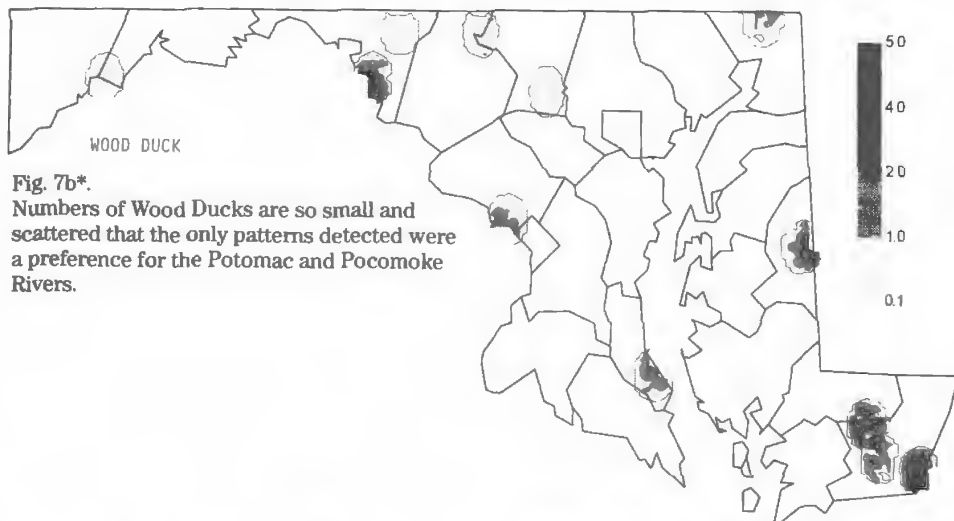


Fig. 7b*.

Numbers of Wood Ducks are so small and scattered that the only patterns detected were a preference for the Potomac and Pocomoke Rivers.

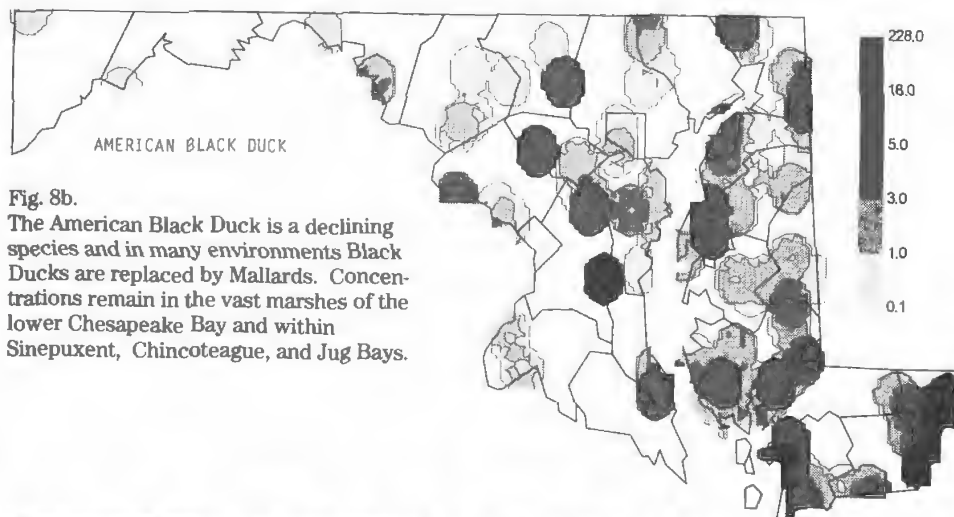


Fig. 8b.

The American Black Duck is a declining species and in many environments Black Ducks are replaced by Mallards. Concentrations remain in the vast marshes of the lower Chesapeake Bay and within Sinexuent, Chincoteague, and Jug Bays.

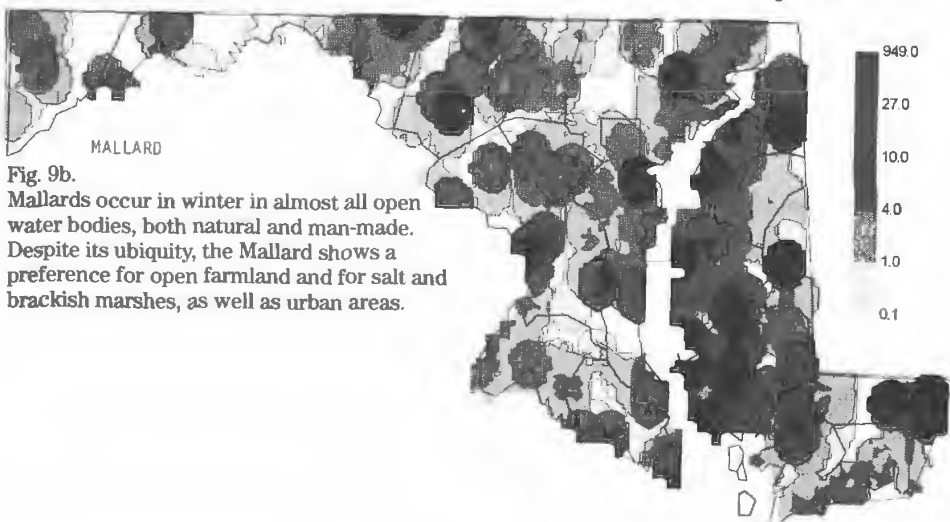


Fig. 9b.

Mallards occur in winter in almost all open water bodies, both natural and man-made. Despite its ubiquity, the Mallard shows a preference for open farmland and for salt and brackish marshes, as well as urban areas.

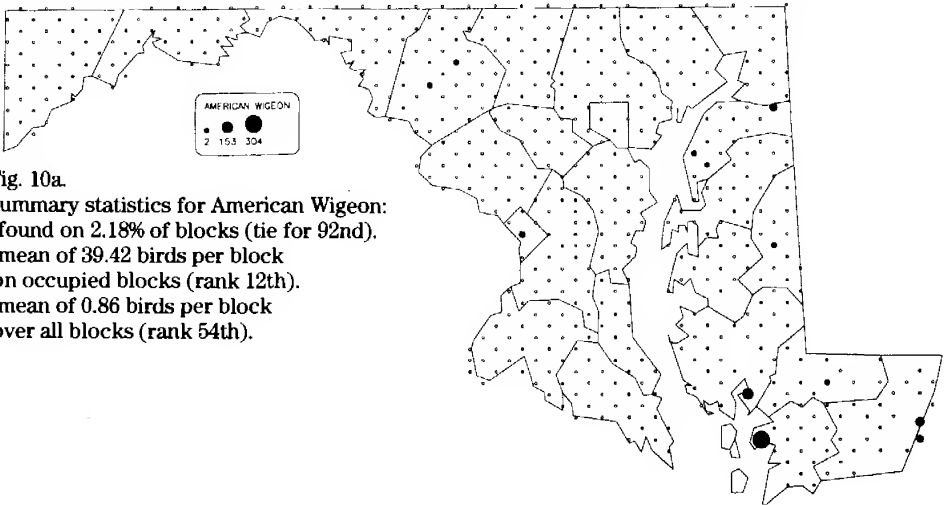


Fig. 10a.

Summary statistics for American Wigeon:

- found on 2.18% of blocks (tie for 92nd).
- mean of 39.42 birds per block on occupied blocks (rank 12th).
- mean of 0.86 birds per block over all blocks (rank 54th).

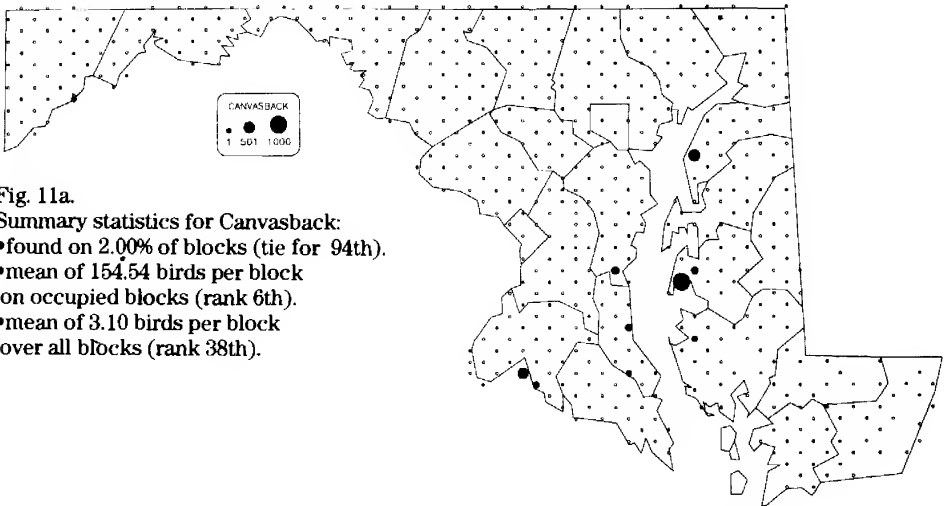


Fig. 11a.

Summary statistics for Canvasback:

- found on 2.00% of blocks (tie for 94th).
- mean of 154.54 birds per block on occupied blocks (rank 6th).
- mean of 3.10 birds per block over all blocks (rank 38th).

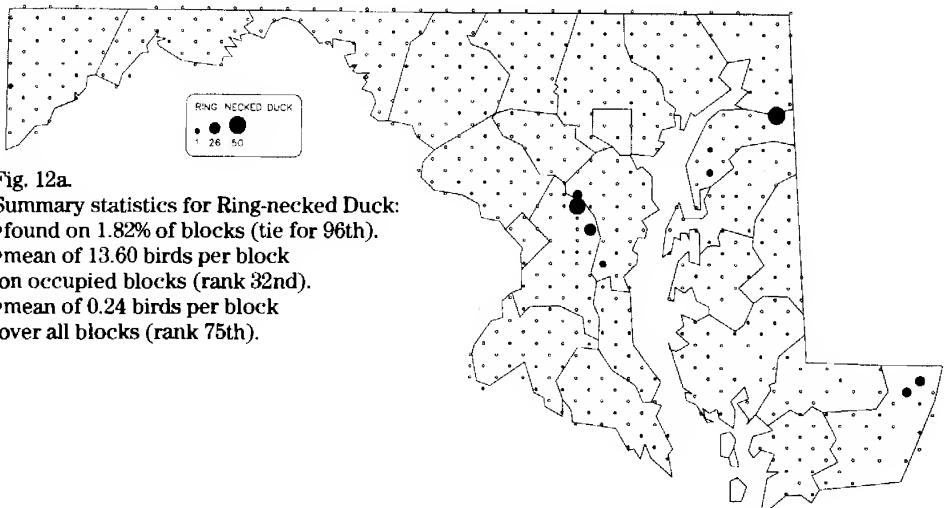
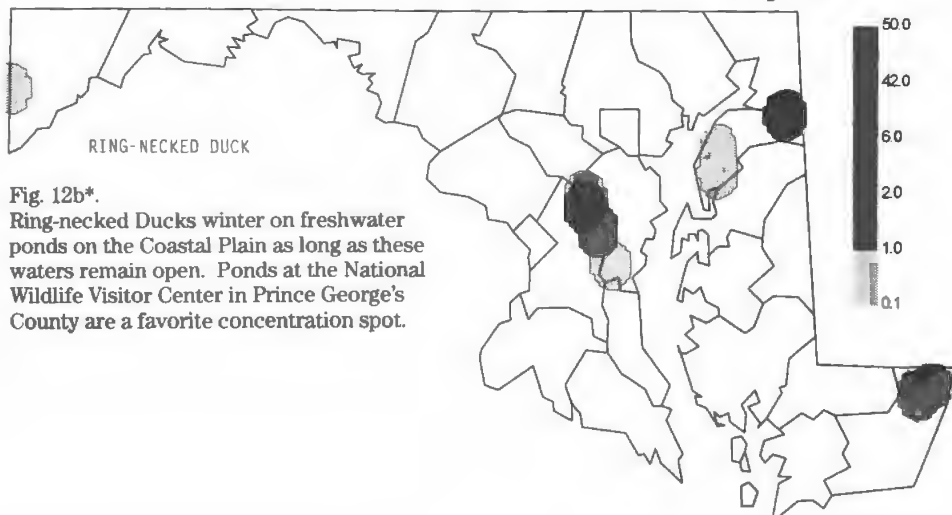
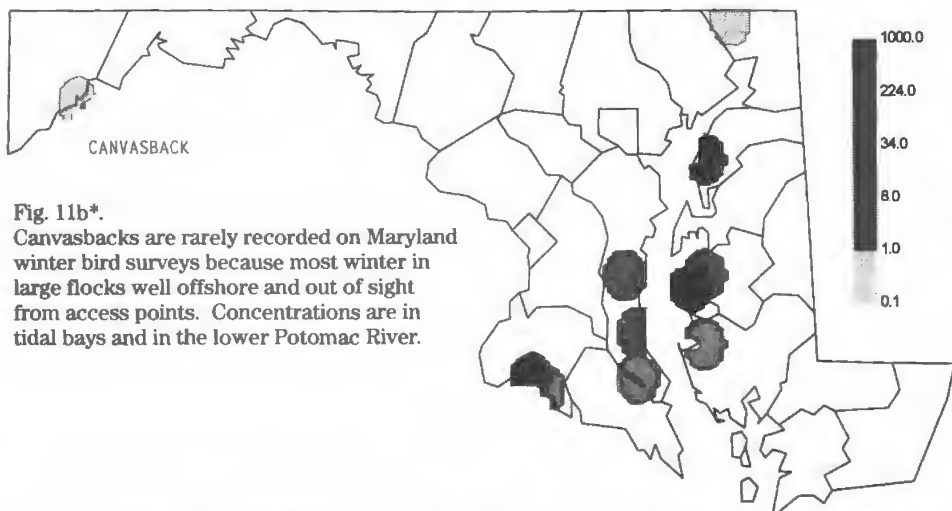
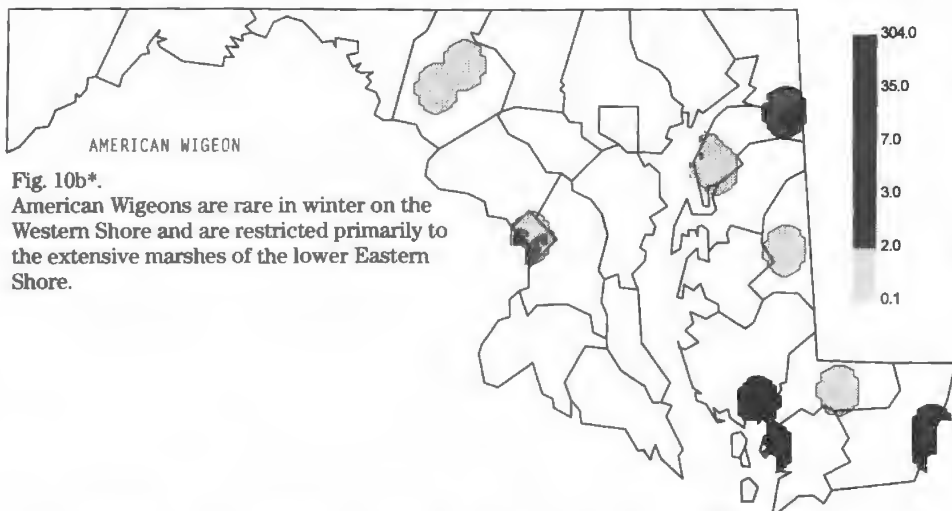


Fig. 12a.

Summary statistics for Ring-necked Duck:

- found on 1.82% of blocks (tie for 96th).
- mean of 13.60 birds per block on occupied blocks (rank 32nd).
- mean of 0.24 birds per block over all blocks (rank 75th).



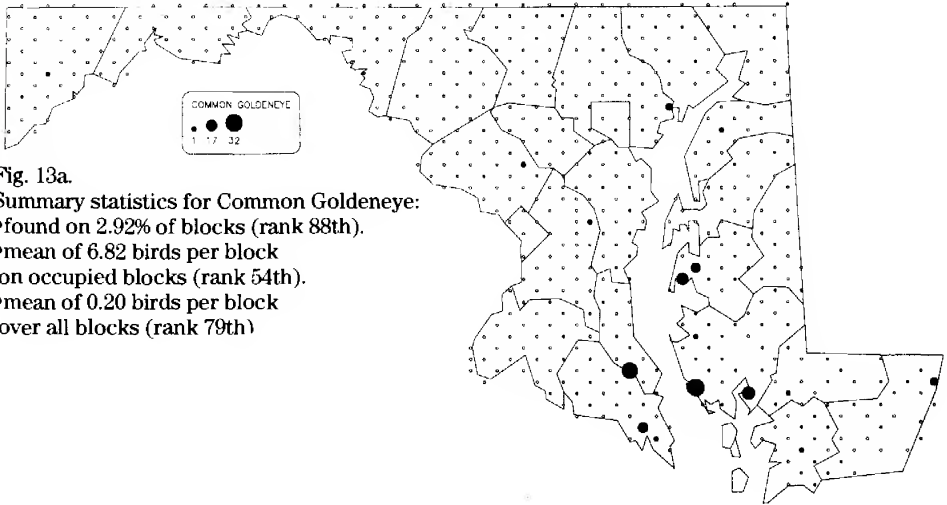


Fig. 13a.

Summary statistics for Common Goldeneye:

- found on 2.92% of blocks (rank 88th).
- mean of 6.82 birds per block on occupied blocks (rank 54th).
- mean of 0.20 birds per block over all blocks (rank 79th)

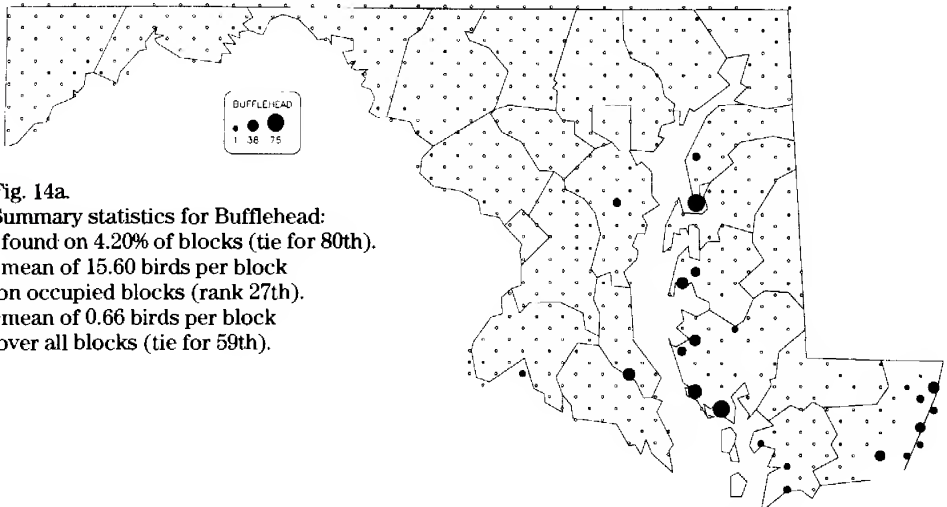


Fig. 14a.

Summary statistics for Bufflehead:

- found on 4.20% of blocks (tie for 80th).
- mean of 15.60 birds per block on occupied blocks (rank 27th).
- mean of 0.66 birds per block over all blocks (tie for 59th).

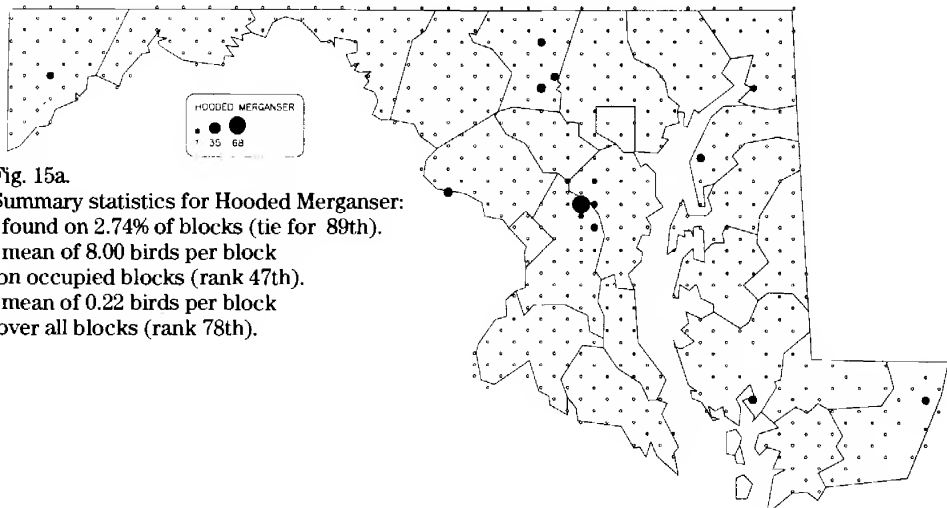


Fig. 15a.

Summary statistics for Hooded Merganser:

- found on 2.74% of blocks (tie for 89th).
- mean of 8.00 birds per block on occupied blocks (rank 47th).
- mean of 0.22 birds per block over all blocks (rank 78th).

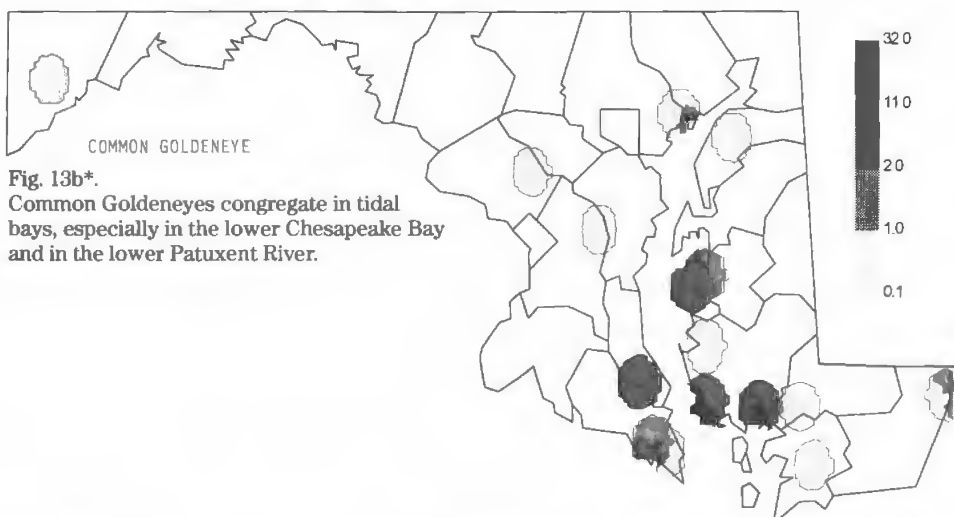


Fig. 13b*.

Common Goldeneyes congregate in tidal bays, especially in the lower Chesapeake Bay and in the lower Patuxent River.

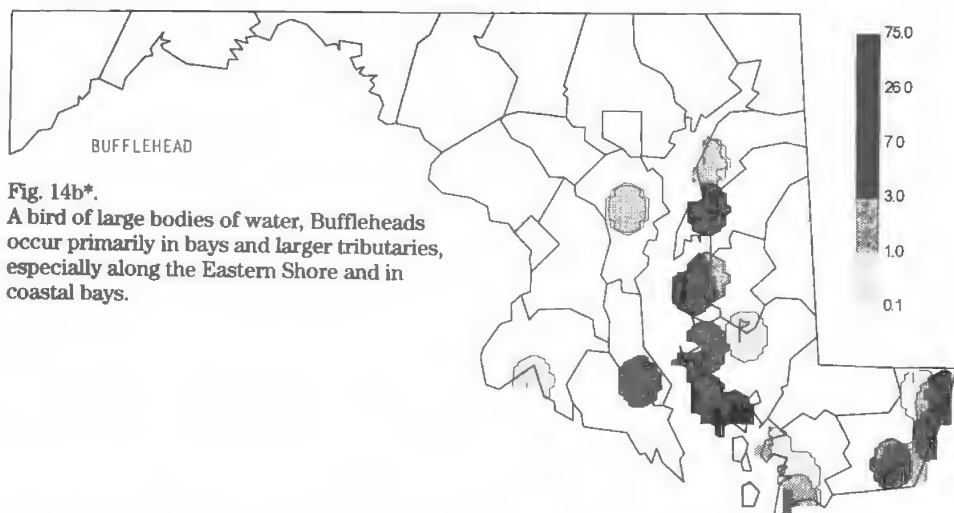


Fig. 14b*.

A bird of large bodies of water, Buffleheads occur primarily in bays and larger tributaries, especially along the Eastern Shore and in coastal bays.

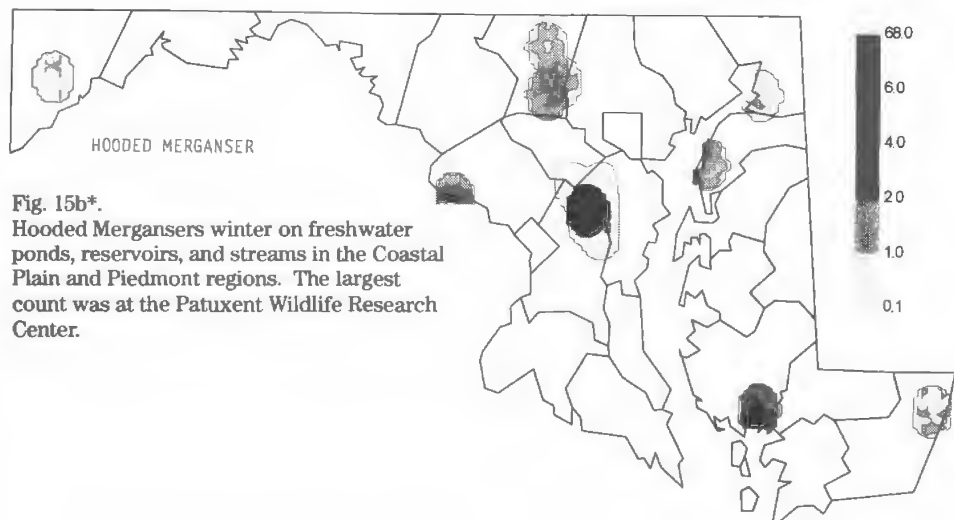


Fig. 15b*.

Hooded Mergansers winter on freshwater ponds, reservoirs, and streams in the Coastal Plain and Piedmont regions. The largest count was at the Patuxent Wildlife Research Center.

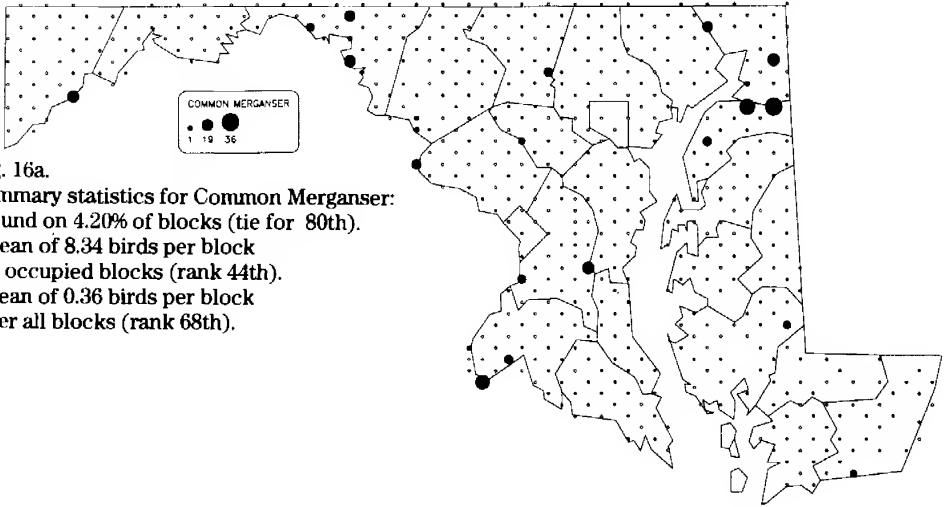


Fig. 16a.

Summary statistics for Common Merganser:

- found on 4.20% of blocks (tie for 80th).
- mean of 8.34 birds per block on occupied blocks (rank 44th).
- mean of 0.36 birds per block over all blocks (rank 68th).

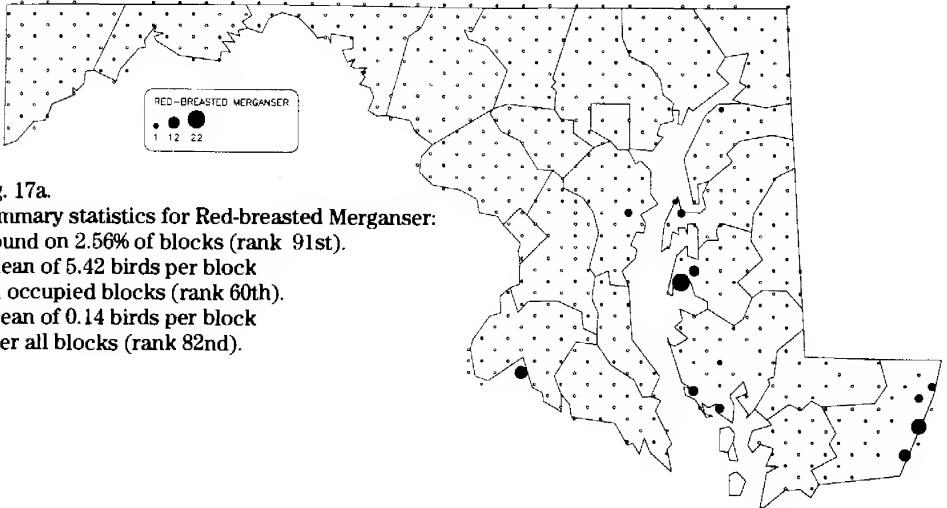


Fig. 17a.

Summary statistics for Red-breasted Merganser:

- found on 2.56% of blocks (rank 91st).
- mean of 5.42 birds per block on occupied blocks (rank 60th).
- mean of 0.14 birds per block over all blocks (rank 82nd).

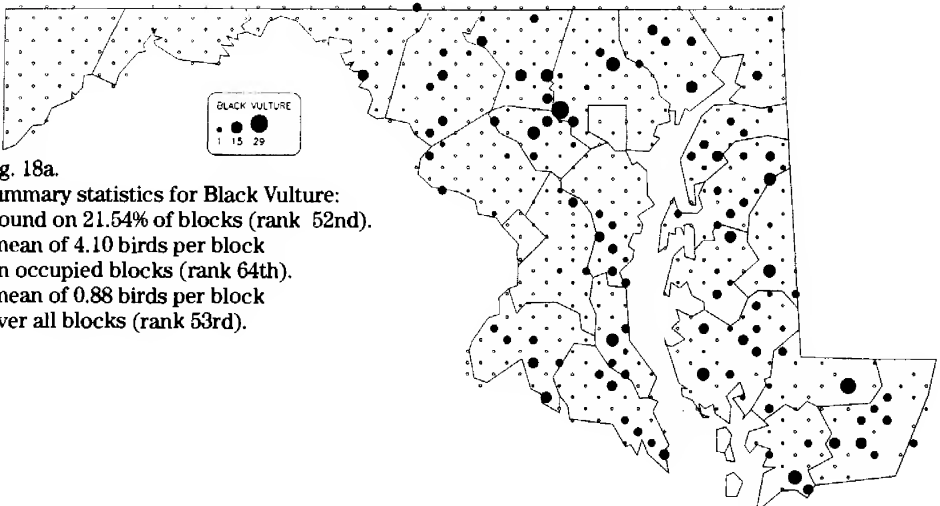


Fig. 18a.

Summary statistics for Black Vulture:

- found on 21.54% of blocks (rank 52nd).
- mean of 4.10 birds per block on occupied blocks (rank 64th).
- mean of 0.88 birds per block over all blocks (rank 53rd).

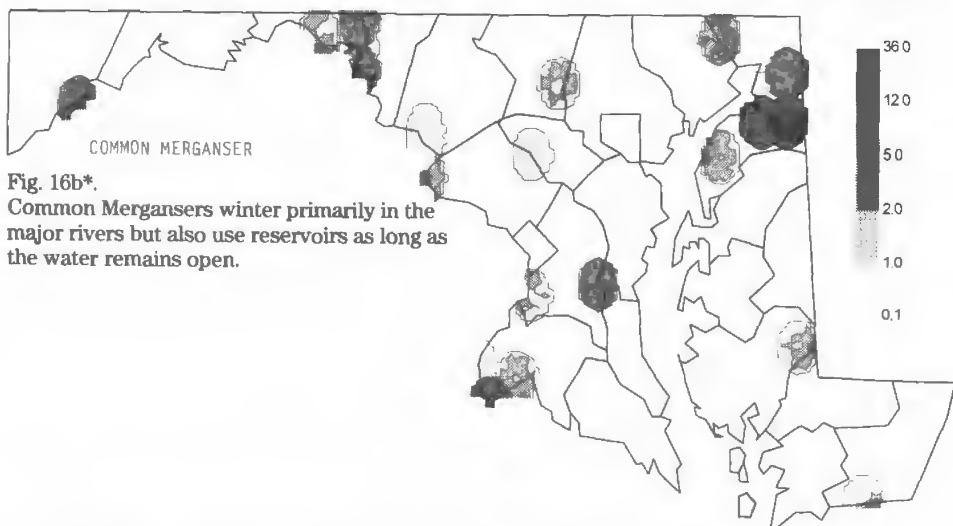


Fig. 16b*.

Common Mergansers winter primarily in the major rivers but also use reservoirs as long as the water remains open.

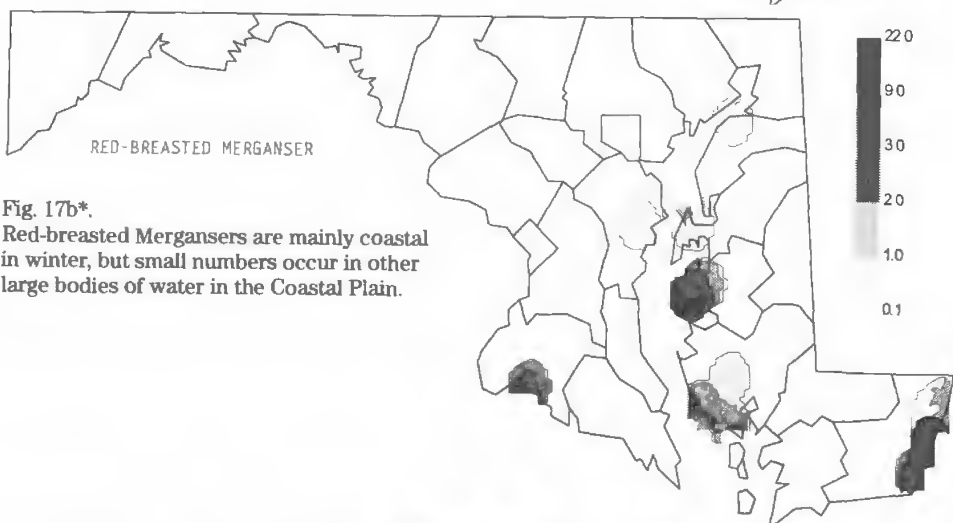


Fig. 17b*.

Red-breasted Mergansers are mainly coastal in winter, but small numbers occur in other large bodies of water in the Coastal Plain.

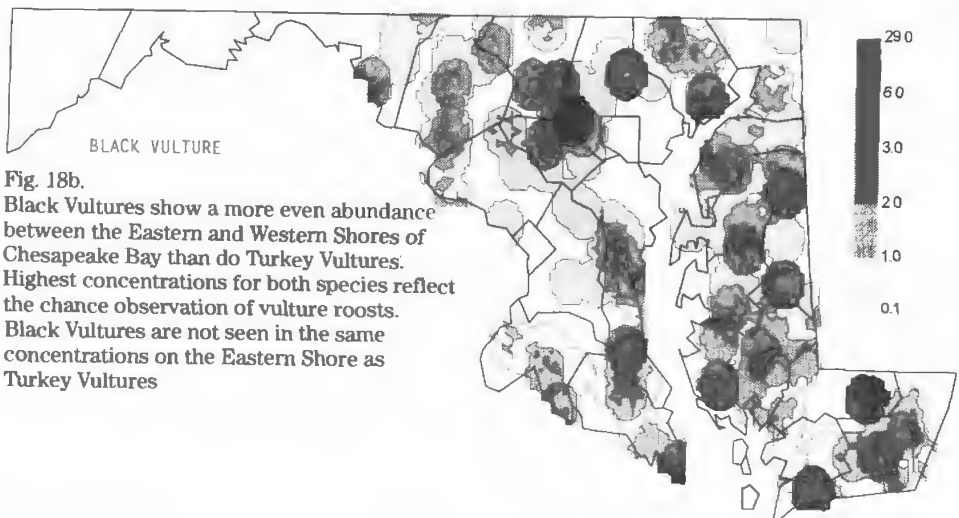


Fig. 18b.

Black Vultures show a more even abundance between the Eastern and Western Shores of Chesapeake Bay than do Turkey Vultures. Highest concentrations for both species reflect the chance observation of vulture roosts. Black Vultures are not seen in the same concentrations on the Eastern Shore as Turkey Vultures

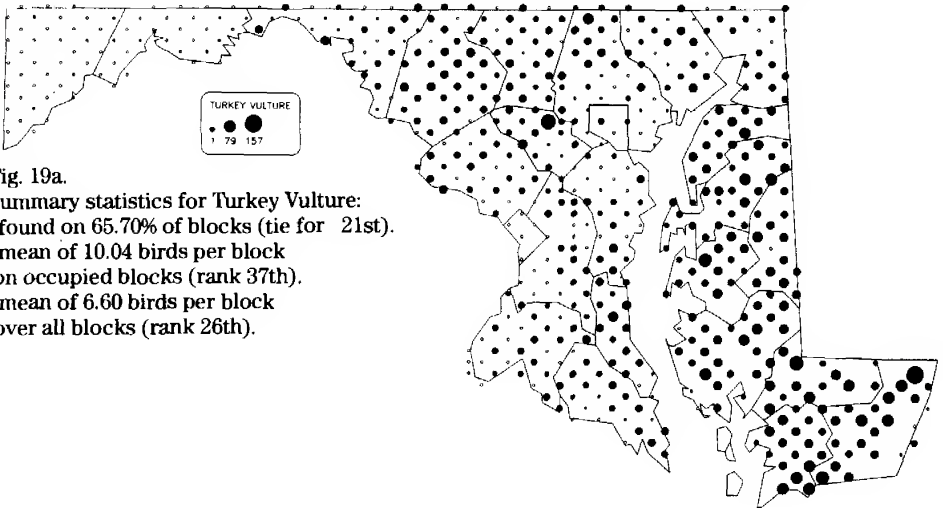


Fig. 19a.

Summary statistics for Turkey Vulture:

- found on 65.70% of blocks (tie for 21st).
- mean of 10.04 birds per block on occupied blocks (rank 37th).
- mean of 6.60 birds per block over all blocks (rank 26th).

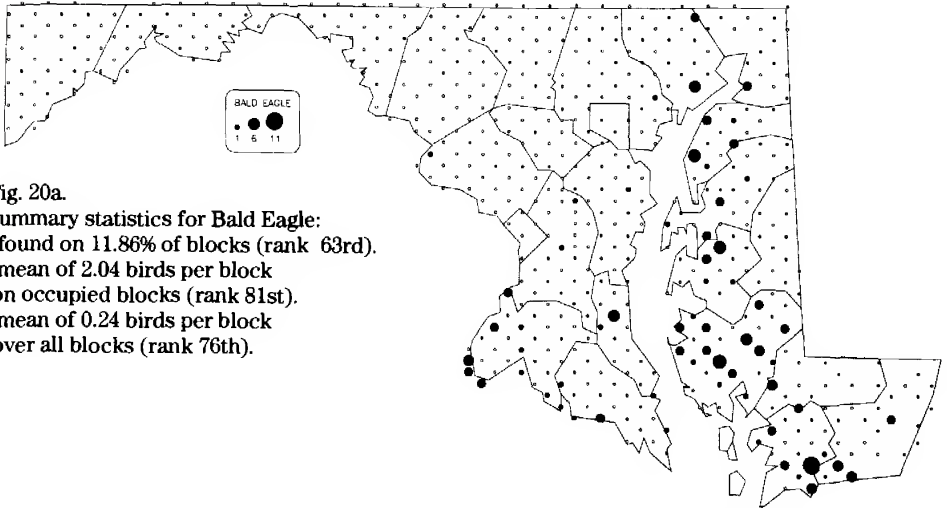


Fig. 20a.

Summary statistics for Bald Eagle:

- found on 11.86% of blocks (rank 63rd).
- mean of 2.04 birds per block on occupied blocks (rank 81st).
- mean of 0.24 birds per block over all blocks (rank 76th).

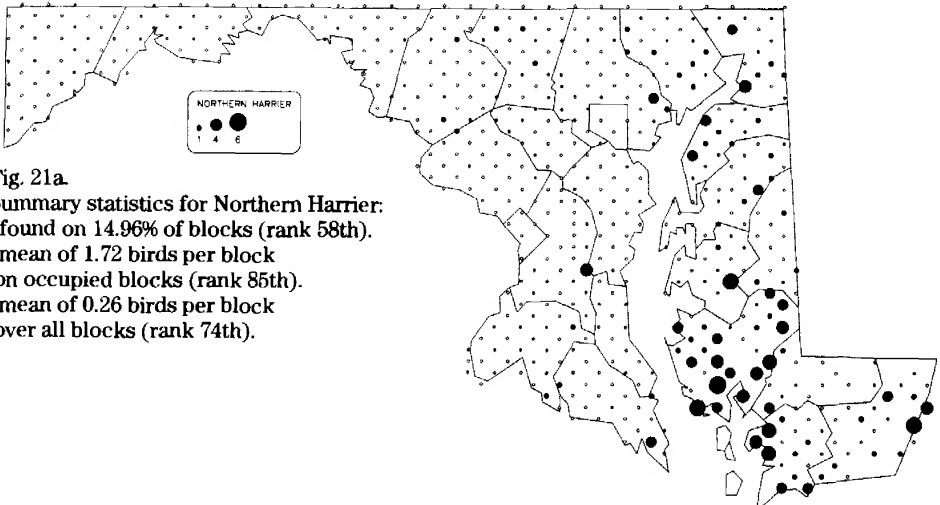


Fig. 21a.

Summary statistics for Northern Harrier:

- found on 14.96% of blocks (rank 58th).
- mean of 1.72 birds per block on occupied blocks (rank 85th).
- mean of 0.26 birds per block over all blocks (rank 74th).

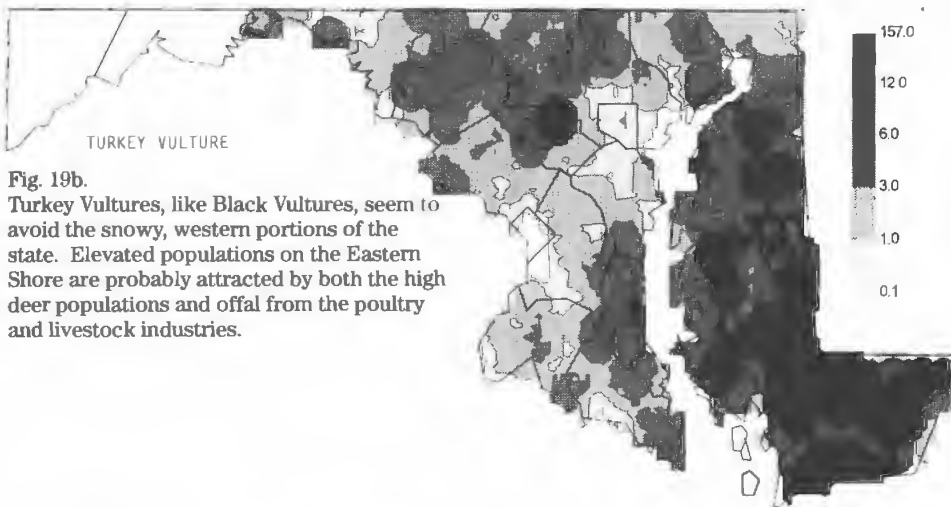


Fig. 19b.

Turkey Vultures, like Black Vultures, seem to avoid the snowy, western portions of the state. Elevated populations on the Eastern Shore are probably attracted by both the high deer populations and offal from the poultry and livestock industries.

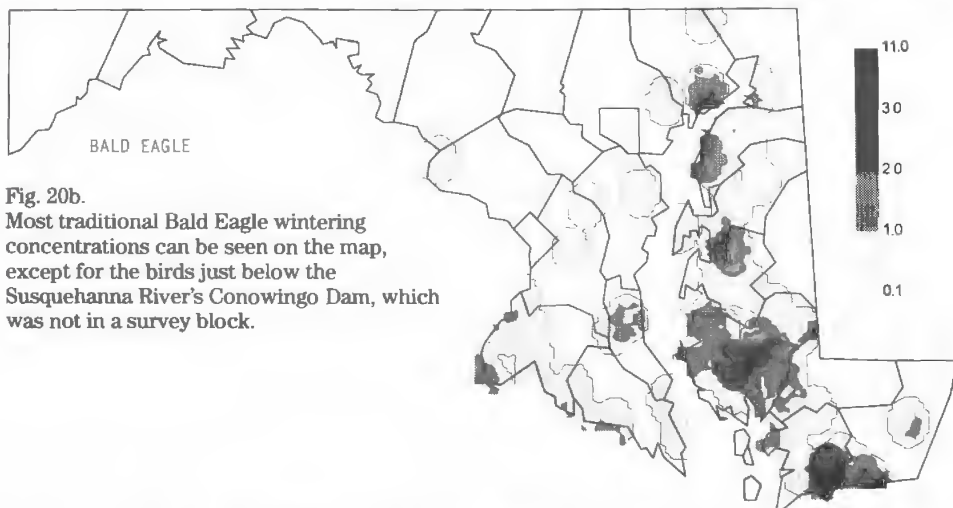


Fig. 20b.

Most traditional Bald Eagle wintering concentrations can be seen on the map, except for the birds just below the Susquehanna River's Conowingo Dam, which was not in a survey block.

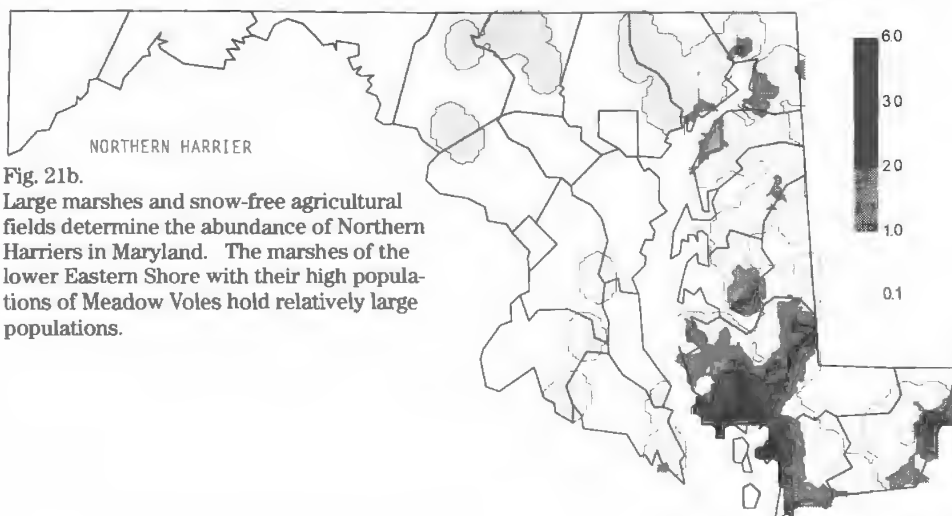


Fig. 21b.

Large marshes and snow-free agricultural fields determine the abundance of Northern Harriers in Maryland. The marshes of the lower Eastern Shore with their high populations of Meadow Voles hold relatively large populations.

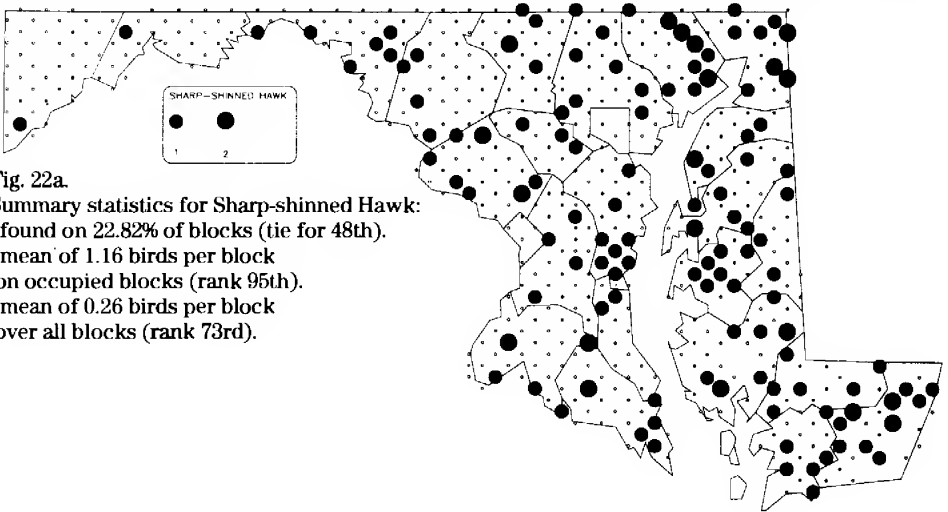


Fig. 22a.

Summary statistics for Sharp-shinned Hawk:

- found on 22.82% of blocks (tie for 48th).
- mean of 1.16 birds per block on occupied blocks (rank 95th).
- mean of 0.26 birds per block over all blocks (rank 73rd).

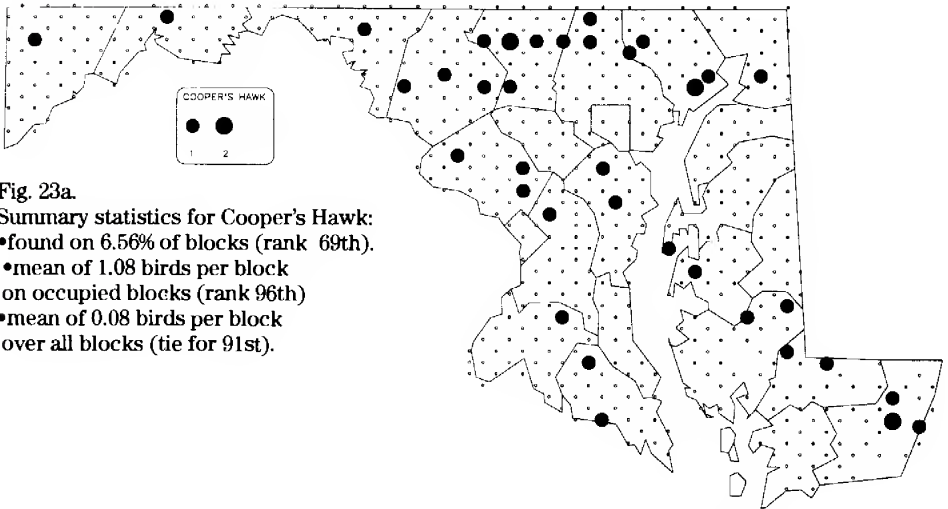


Fig. 23a.

Summary statistics for Cooper's Hawk:

- found on 6.56% of blocks (rank 69th).
- mean of 1.08 birds per block on occupied blocks (rank 96th)
- mean of 0.08 birds per block over all blocks (tie for 91st).

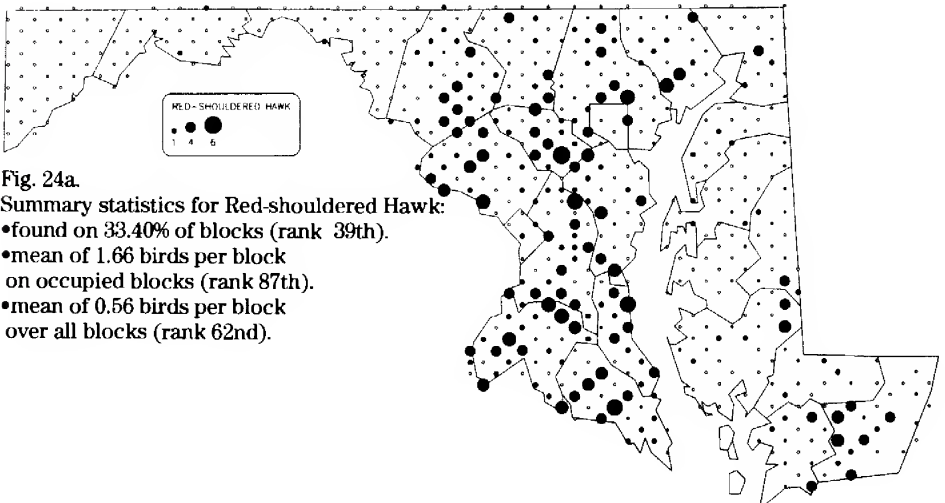


Fig. 24a.

Summary statistics for Red-shouldered Hawk:

- found on 33.40% of blocks (rank 39th).
- mean of 1.66 birds per block on occupied blocks (rank 87th).
- mean of 0.56 birds per block over all blocks (rank 62nd).

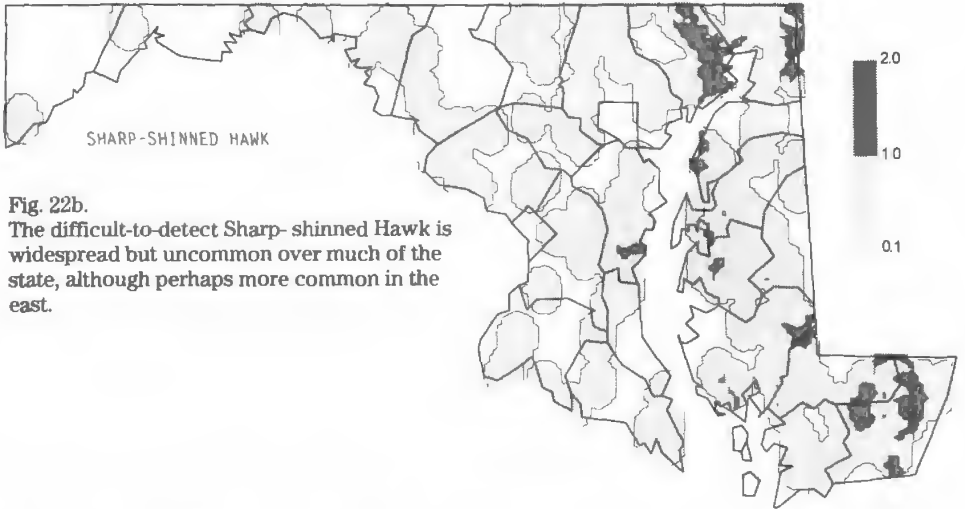


Fig. 22b.
The difficult-to-detect Sharp-shinned Hawk is widespread but uncommon over much of the state, although perhaps more common in the east.

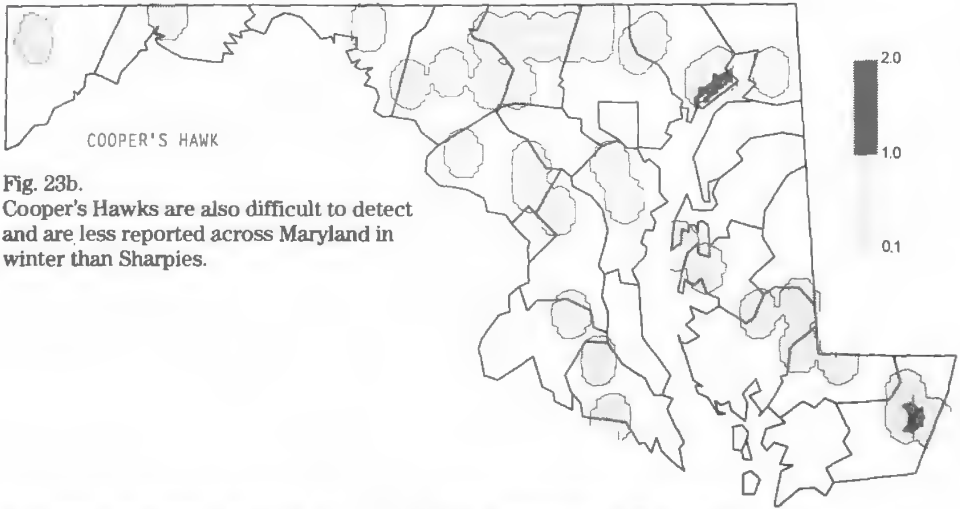


Fig. 23b.
Cooper's Hawks are also difficult to detect and are less reported across Maryland in winter than Sharpies.

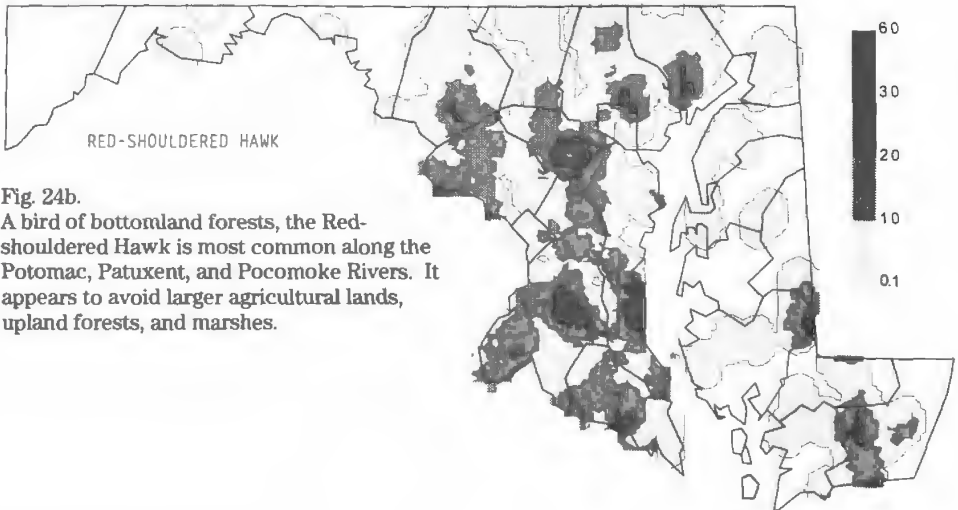


Fig. 24b.
A bird of bottomland forests, the Red-shouldered Hawk is most common along the Potomac, Patuxent, and Pocomoke Rivers. It appears to avoid larger agricultural lands, upland forests, and marshes.

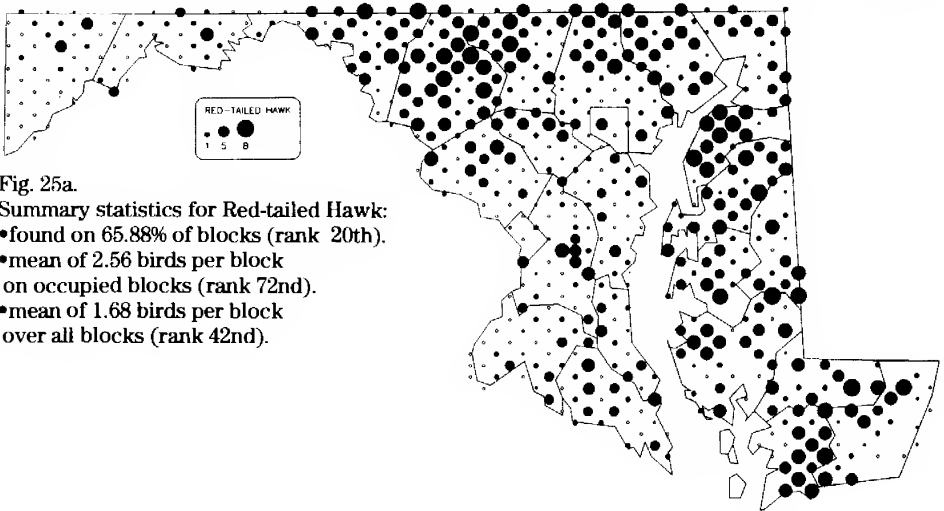


Fig. 25a.

Summary statistics for Red-tailed Hawk:

- found on 65.88% of blocks (rank 20th).
- mean of 2.56 birds per block on occupied blocks (rank 72nd).
- mean of 1.68 birds per block over all blocks (rank 42nd).

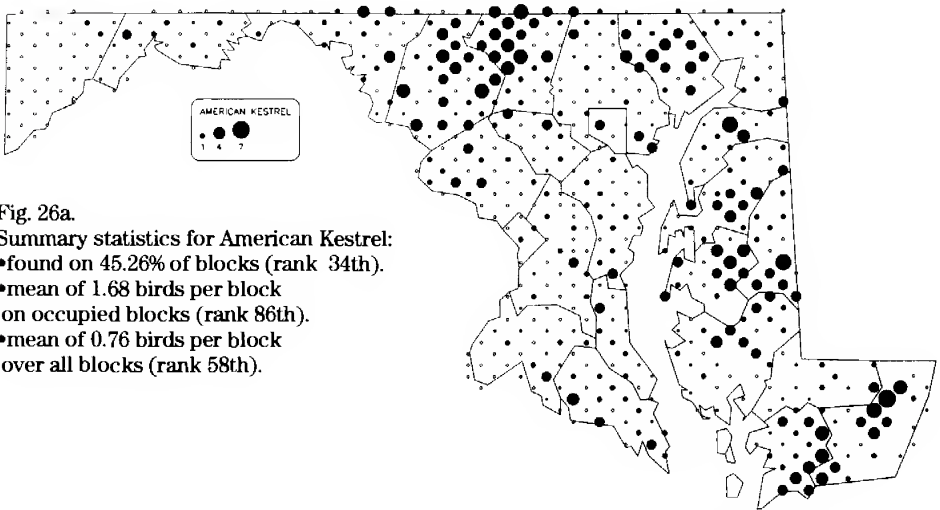


Fig. 26a.

Summary statistics for American Kestrel:

- found on 45.26% of blocks (rank 34th).
- mean of 1.68 birds per block on occupied blocks (rank 86th).
- mean of 0.76 birds per block over all blocks (rank 58th).

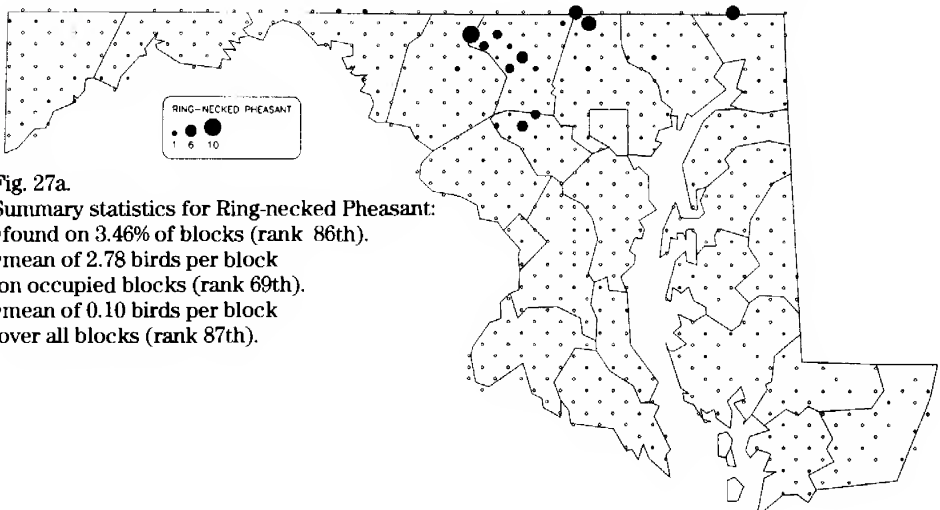


Fig. 27a.

Summary statistics for Ring-necked Pheasant:

- found on 3.46% of blocks (rank 86th).
- mean of 2.78 birds per block on occupied blocks (rank 69th).
- mean of 0.10 birds per block over all blocks (rank 87th).

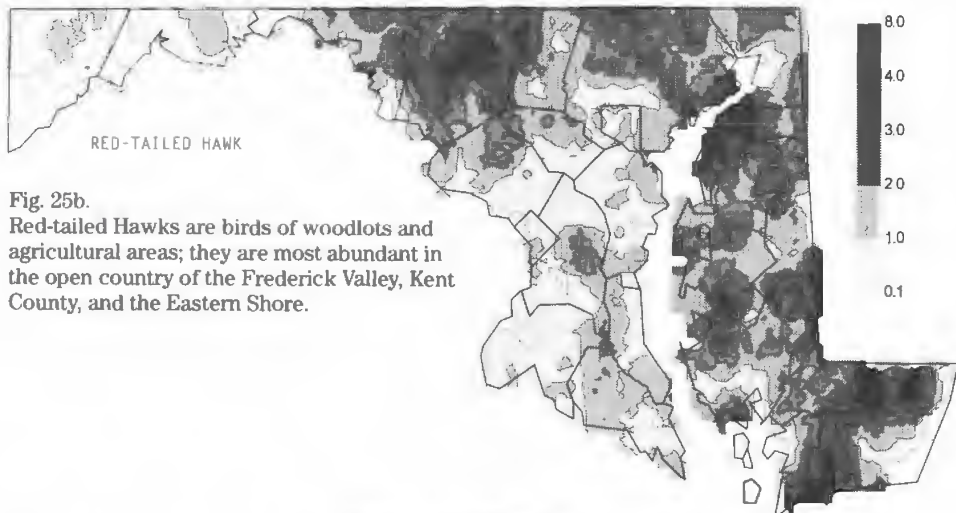


Fig. 25b.

Red-tailed Hawks are birds of woodlots and agricultural areas; they are most abundant in the open country of the Frederick Valley, Kent County, and the Eastern Shore.

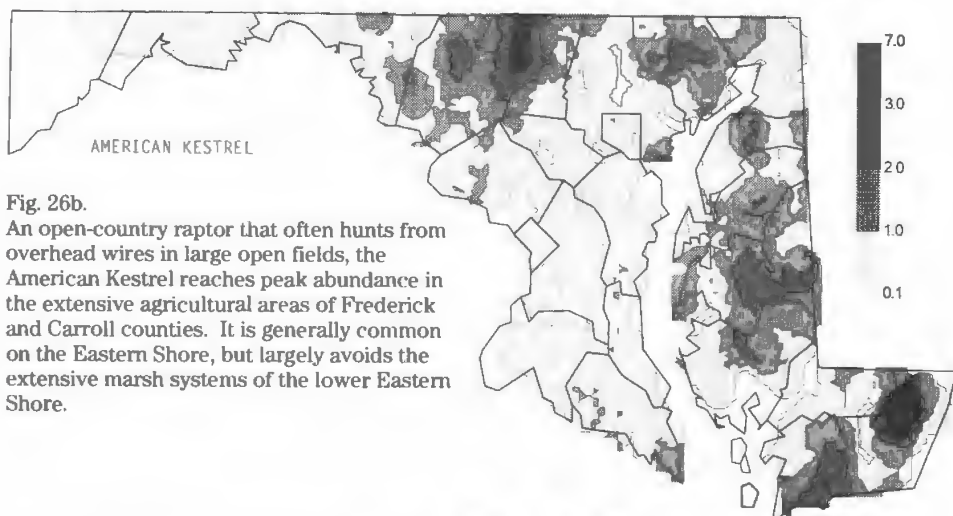


Fig. 26b.

An open-country raptor that often hunts from overhead wires in large open fields, the American Kestrel reaches peak abundance in the extensive agricultural areas of Frederick and Carroll counties. It is generally common on the Eastern Shore, but largely avoids the extensive marsh systems of the lower Eastern Shore.

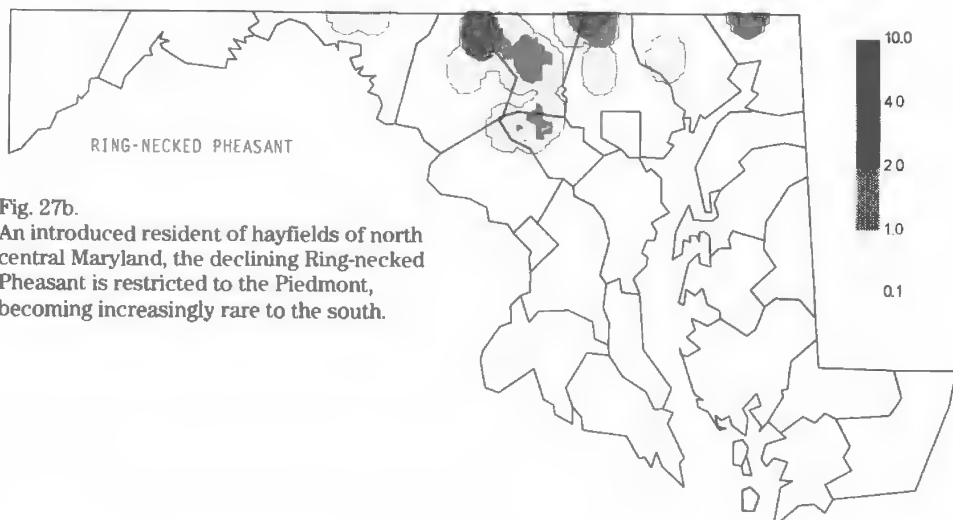


Fig. 27b.

An introduced resident of hayfields of north central Maryland, the declining Ring-necked Pheasant is restricted to the Piedmont, becoming increasingly rare to the south.

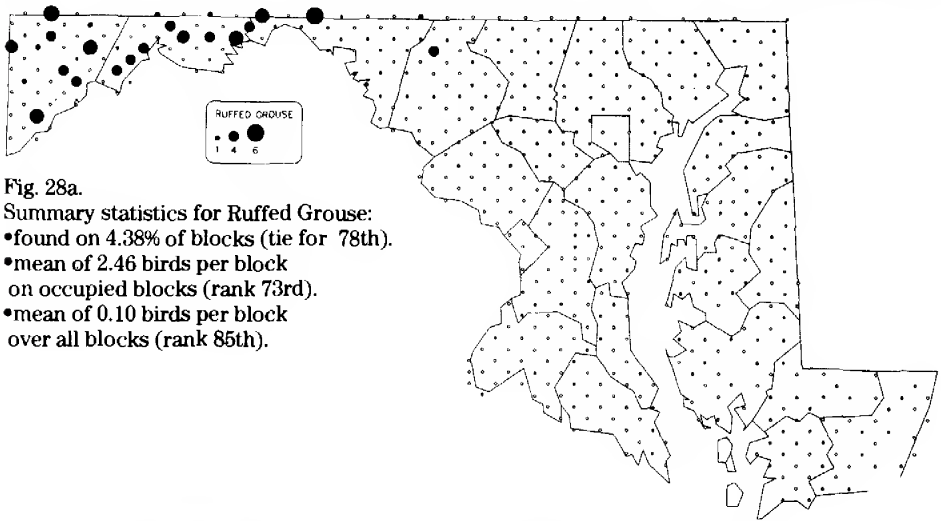


Fig. 28a.

Summary statistics for Ruffed Grouse:

- found on 4.38% of blocks (tie for 78th).
- mean of 2.46 birds per block on occupied blocks (rank 73rd).
- mean of 0.10 birds per block over all blocks (rank 85th).

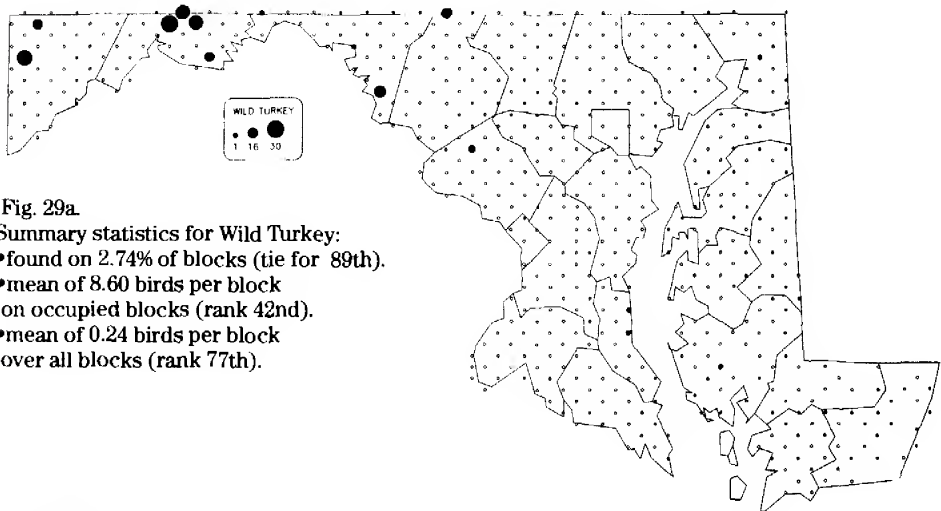


Fig. 29a.

Summary statistics for Wild Turkey:

- found on 2.74% of blocks (tie for 89th).
- mean of 8.60 birds per block on occupied blocks (rank 42nd).
- mean of 0.24 birds per block over all blocks (rank 77th).

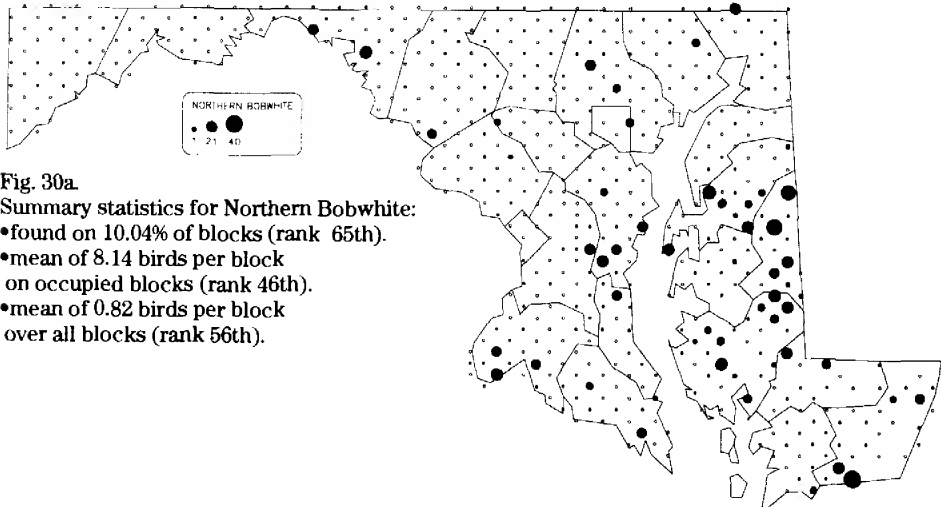


Fig. 30a.

Summary statistics for Northern Bobwhite:

- found on 10.04% of blocks (rank 65th).
- mean of 8.14 birds per block on occupied blocks (rank 46th).
- mean of 0.82 birds per block over all blocks (rank 56th).

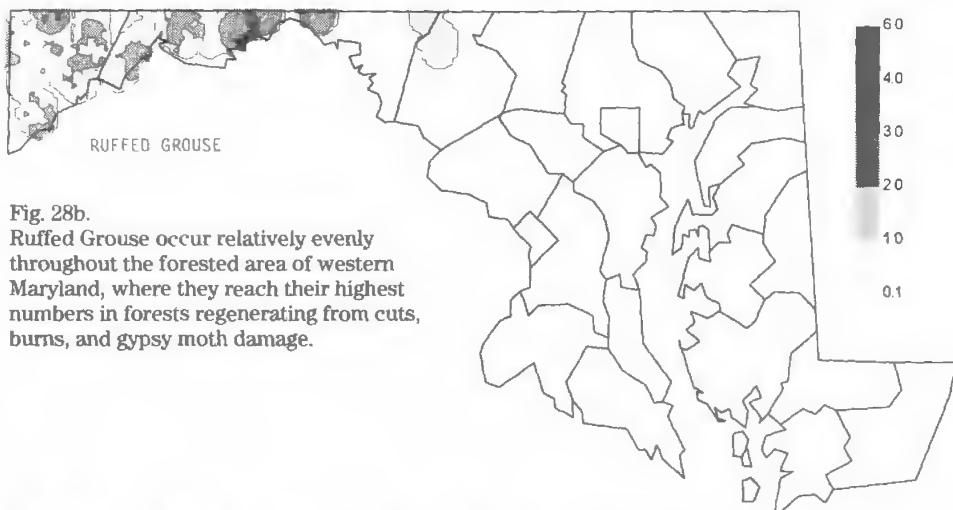


Fig. 28b.

Ruffed Grouse occur relatively evenly throughout the forested area of western Maryland, where they reach their highest numbers in forests regenerating from cuts, burns, and gypsy moth damage.



Fig. 29b*.

Except for small pockets of reintroduced birds, Wild Turkeys are restricted to the forested portions of western Maryland.

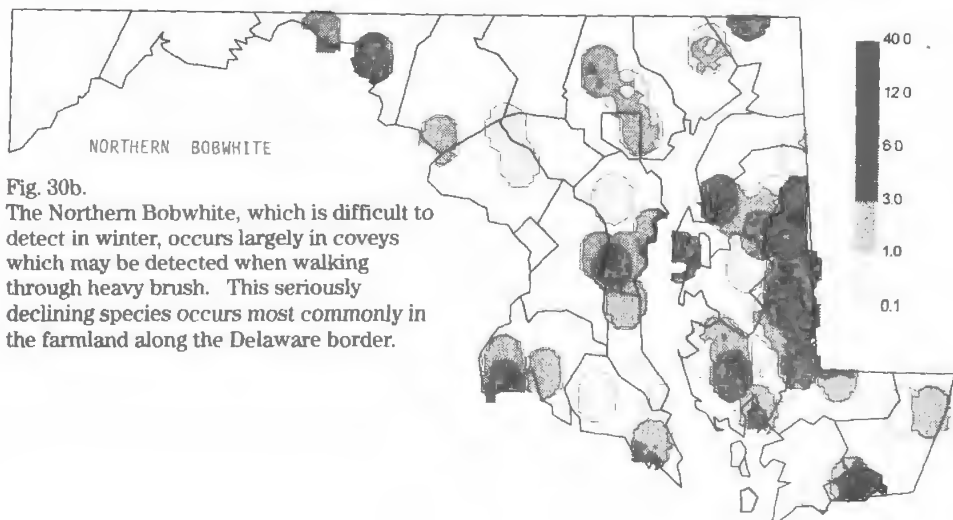


Fig. 30b.

The Northern Bobwhite, which is difficult to detect in winter, occurs largely in coveys which may be detected when walking through heavy brush. This seriously declining species occurs most commonly in the farmland along the Delaware border.

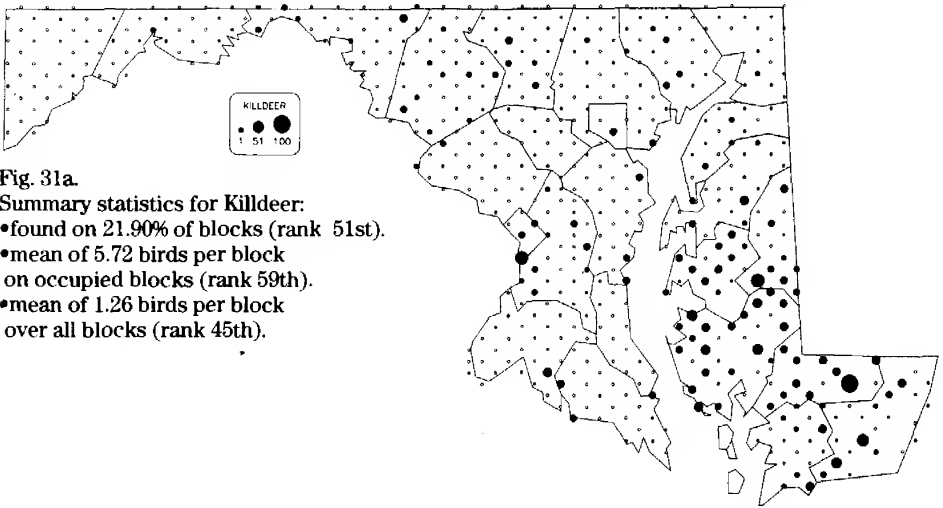


Fig. 31a.

Summary statistics for Killdeer:

- found on 21.90% of blocks (rank 51st).
- mean of 5.72 birds per block on occupied blocks (rank 59th).
- mean of 1.26 birds per block over all blocks (rank 45th).

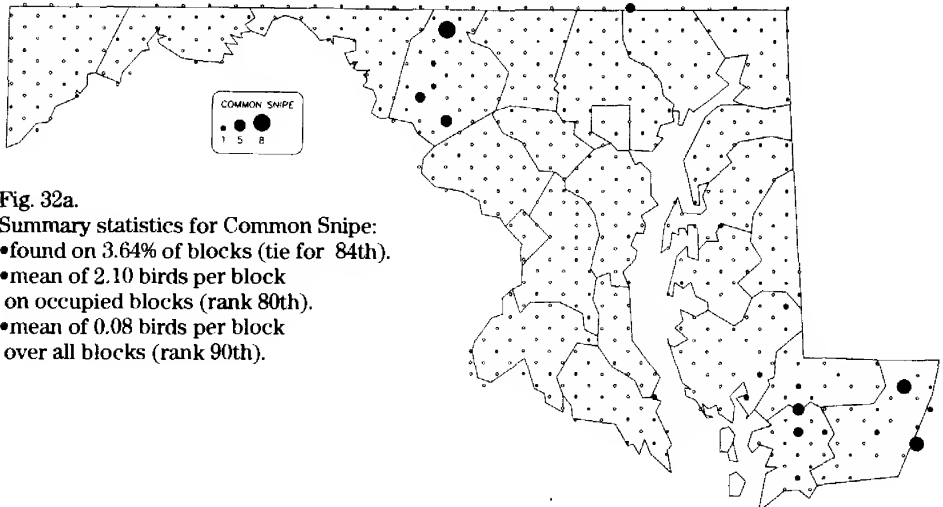


Fig. 32a.

Summary statistics for Common Snipe:

- found on 3.64% of blocks (tie for 84th).
- mean of 2.10 birds per block on occupied blocks (rank 80th).
- mean of 0.08 birds per block over all blocks (rank 90th).

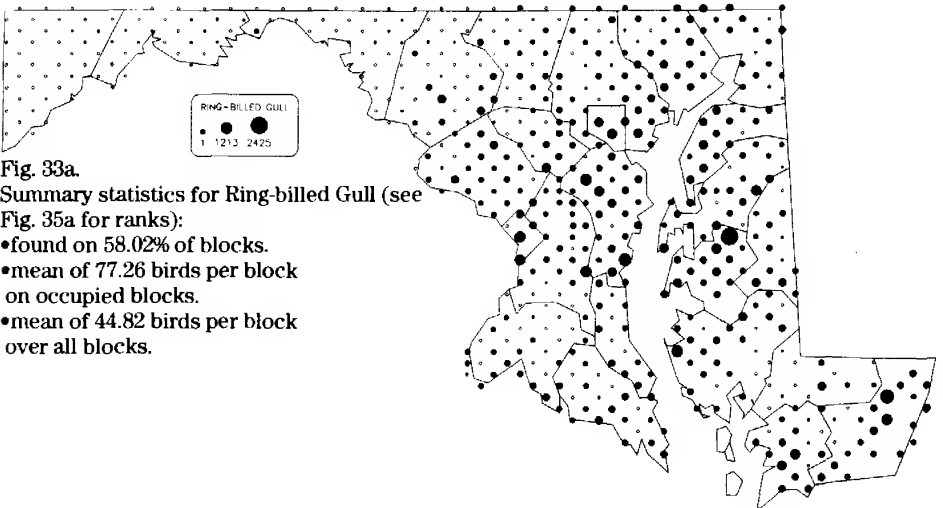


Fig. 33a.

Summary statistics for Ring-billed Gull (see Fig. 35a for ranks):

- found on 58.02% of blocks.
- mean of 77.26 birds per block on occupied blocks.
- mean of 44.82 birds per block over all blocks.

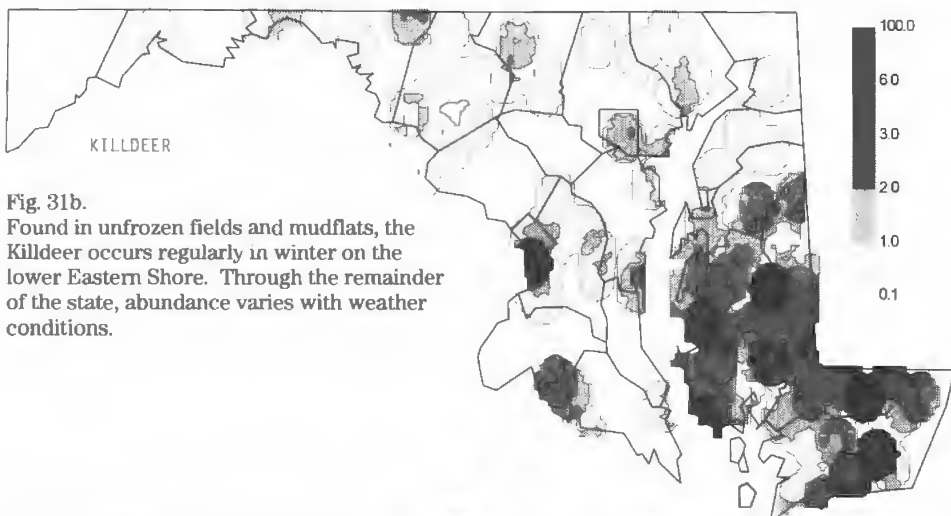


Fig. 31b.

Found in unfrozen fields and mudflats, the Killdeer occurs regularly in winter on the lower Eastern Shore. Through the remainder of the state, abundance varies with weather conditions.

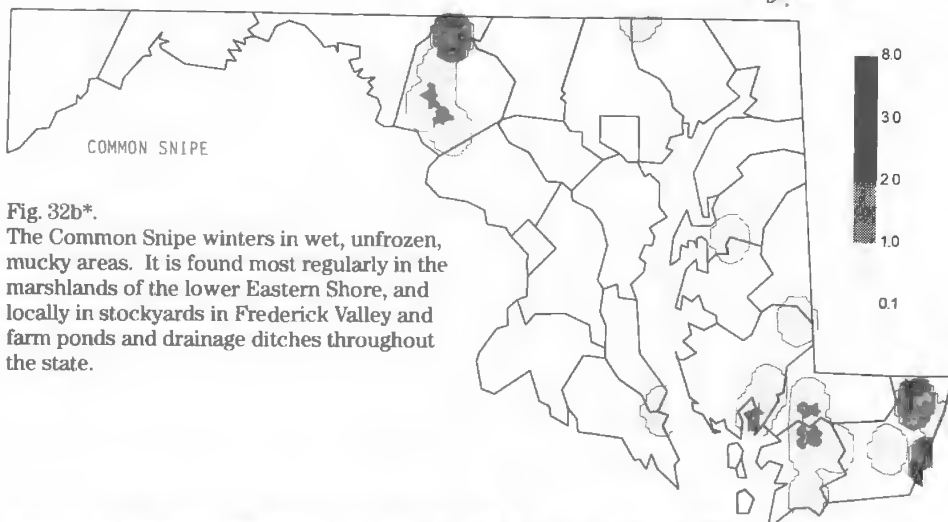


Fig. 32b*.

The Common Snipe winters in wet, unfrozen, mucky areas. It is found most regularly in the marshlands of the lower Eastern Shore, and locally in stockyards in Frederick Valley and farm ponds and drainage ditches throughout the state.

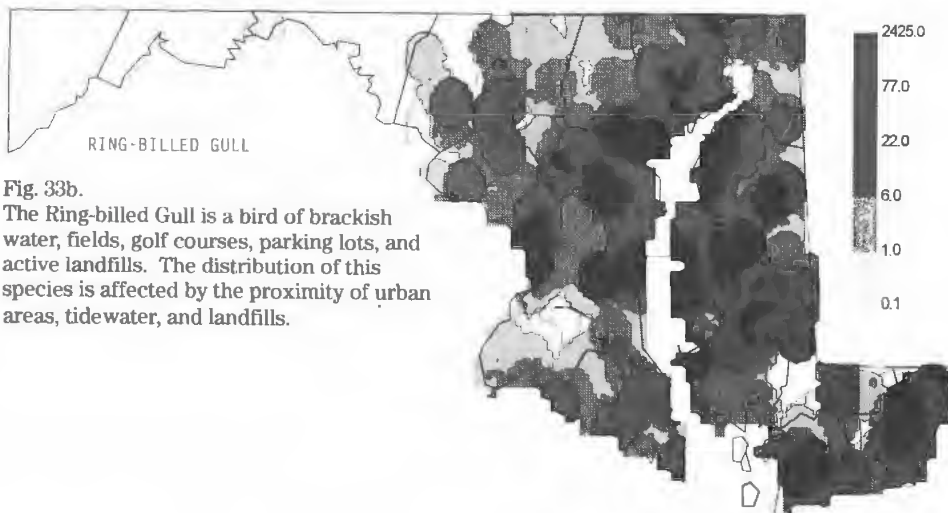


Fig. 33b.

The Ring-billed Gull is a bird of brackish water, fields, golf courses, parking lots, and active landfills. The distribution of this species is affected by the proximity of urban areas, tidewater, and landfills.

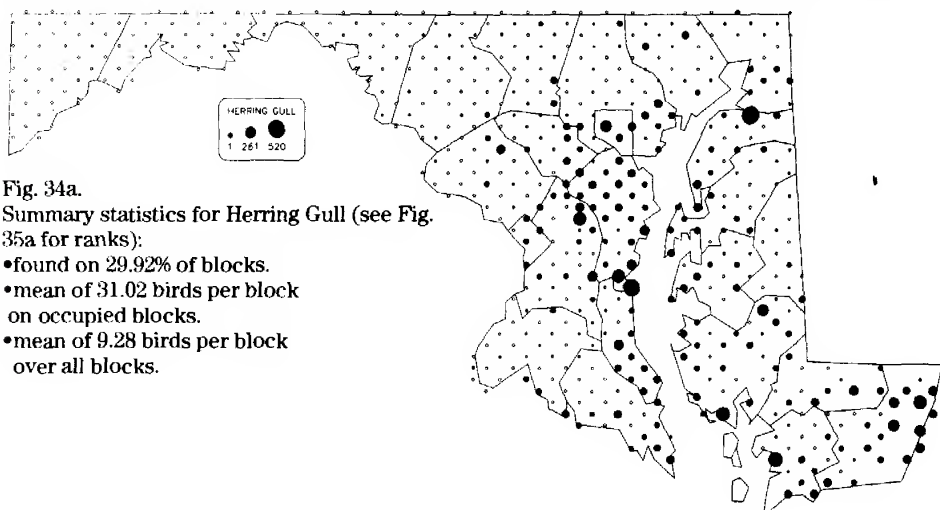


Fig. 34a.

Summary statistics for Herring Gull (see Fig. 35a for ranks):

- found on 29.92% of blocks.
- mean of 31.02 birds per block on occupied blocks.
- mean of 9.28 birds per block over all blocks.

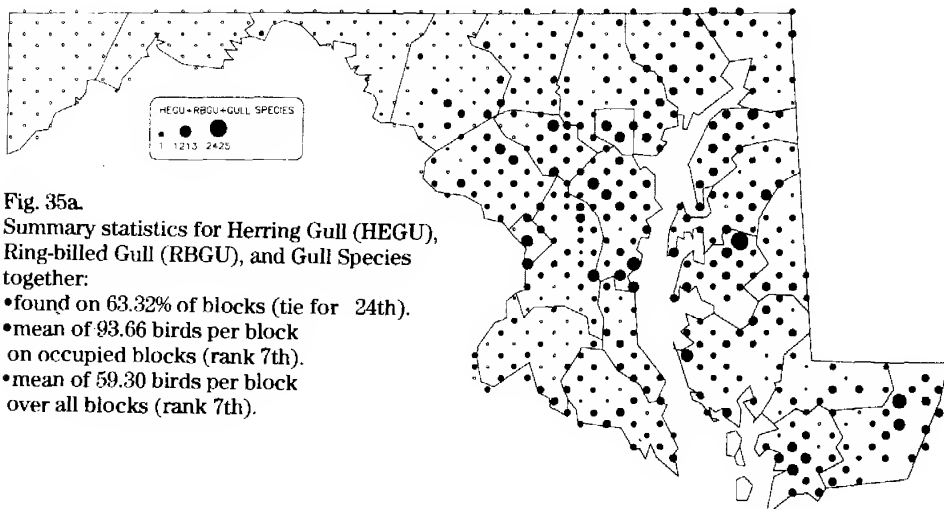


Fig. 35a.

Summary statistics for Herring Gull (HEGU), Ring-billed Gull (RBGU), and Gull Species together:

- found on 63.32% of blocks (tie for 24th).
- mean of 93.66 birds per block on occupied blocks (rank 7th).
- mean of 59.30 birds per block over all blocks (rank 7th).

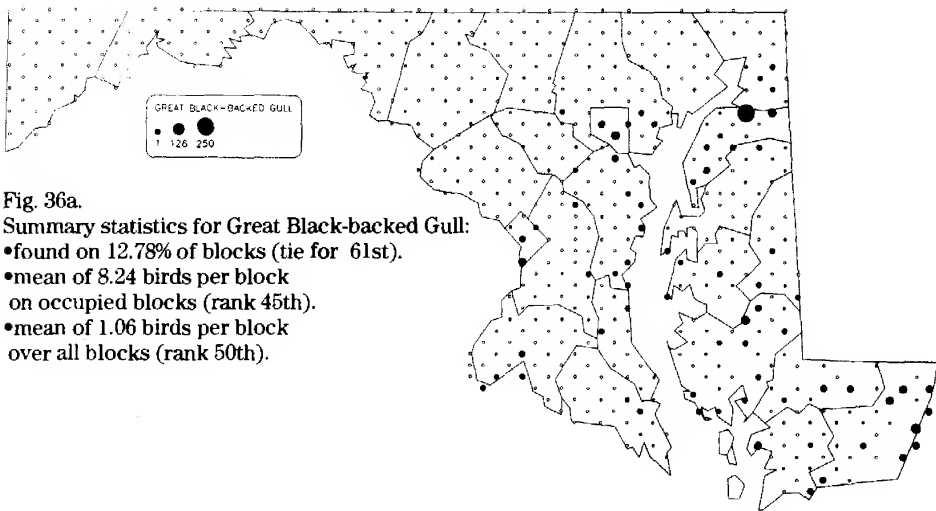


Fig. 36a.

Summary statistics for Great Black-backed Gull:

- found on 12.78% of blocks (tie for 61st).
- mean of 8.24 birds per block on occupied blocks (rank 45th).
- mean of 1.06 birds per block over all blocks (rank 50th).

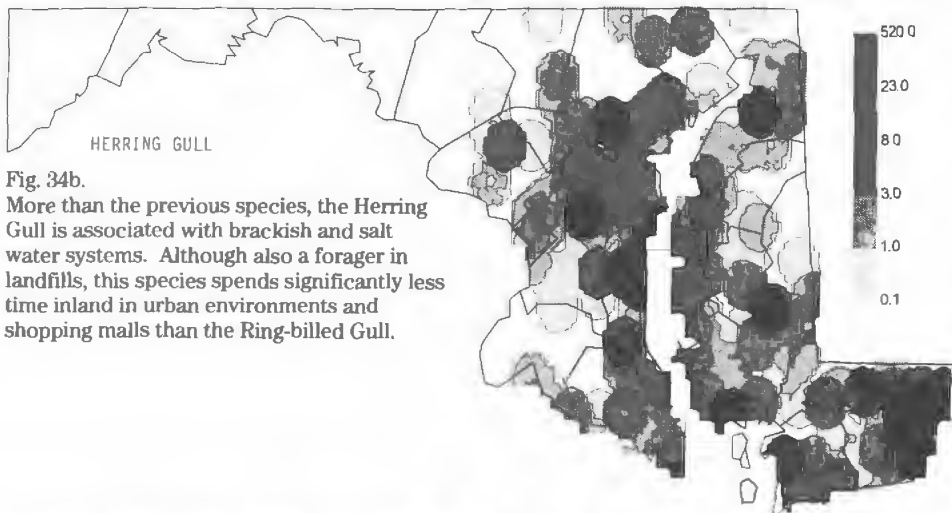


Fig. 34b.

More than the previous species, the Herring Gull is associated with brackish and salt water systems. Although also a forager in landfills, this species spends significantly less time inland in urban environments and shopping malls than the Ring-billed Gull.

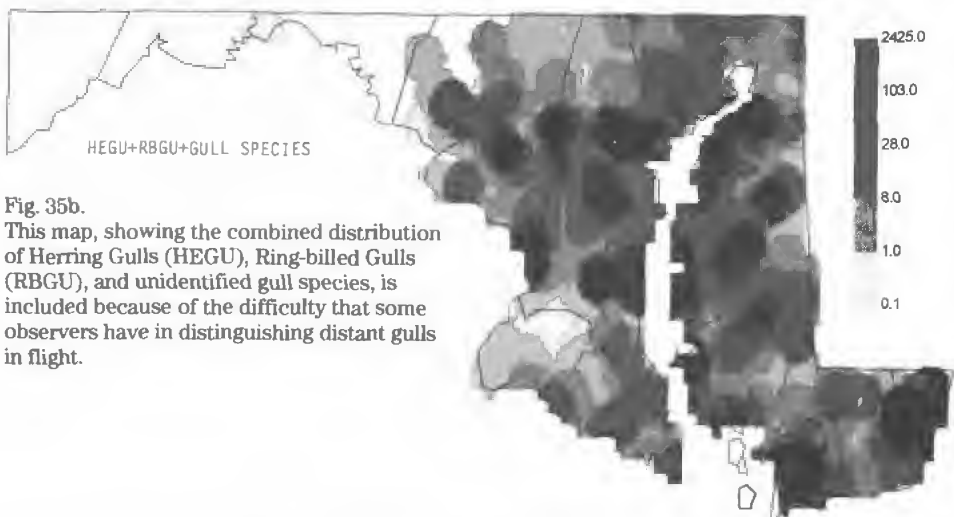


Fig. 35b.

This map, showing the combined distribution of Herring Gulls (HEGU), Ring-billed Gulls (RBGU), and unidentified gull species, is included because of the difficulty that some observers have in distinguishing distant gulls in flight.

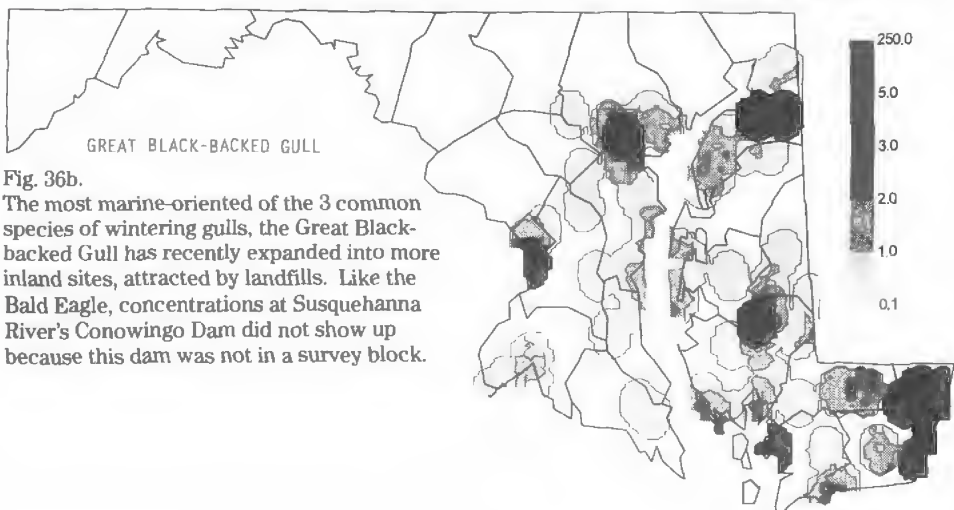


Fig. 36b.

The most marine-oriented of the 3 common species of wintering gulls, the Great Black-backed Gull has recently expanded into more inland sites, attracted by landfills. Like the Bald Eagle, concentrations at Susquehanna River's Conowingo Dam did not show up because this dam was not in a survey block.

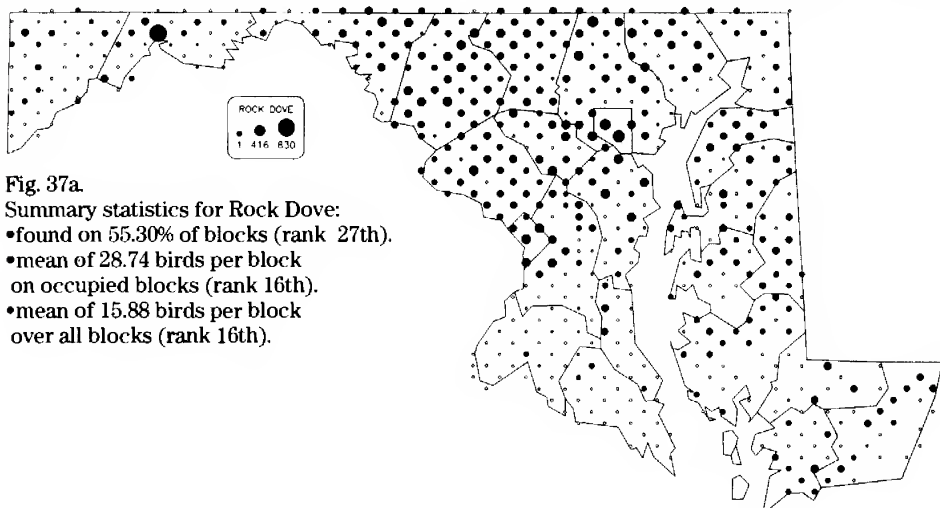


Fig. 37a.

Summary statistics for Rock Dove:

- found on 55.30% of blocks (rank 27th).
- mean of 28.74 birds per block on occupied blocks (rank 16th).
- mean of 15.88 birds per block over all blocks (rank 16th).

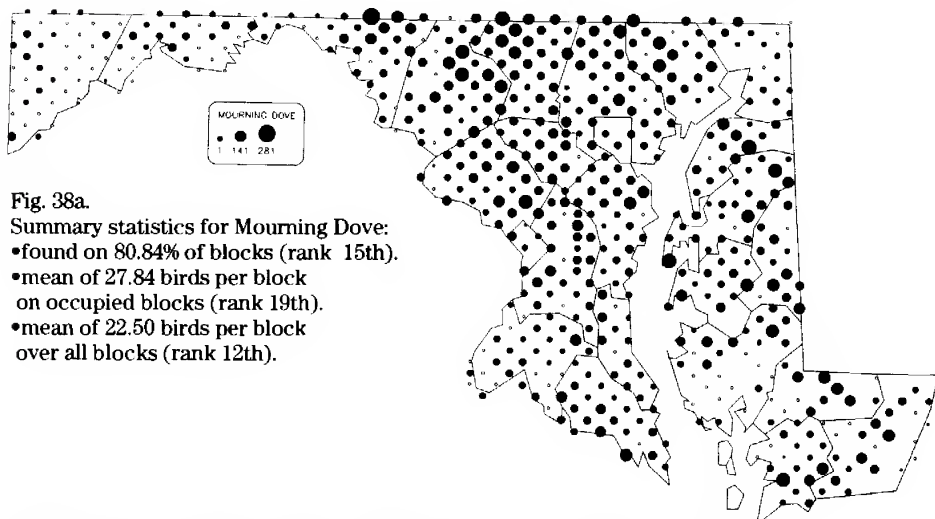


Fig. 38a.

Summary statistics for Mourning Dove:

- found on 80.84% of blocks (rank 15th).
- mean of 27.84 birds per block on occupied blocks (rank 19th).
- mean of 22.50 birds per block over all blocks (rank 12th).

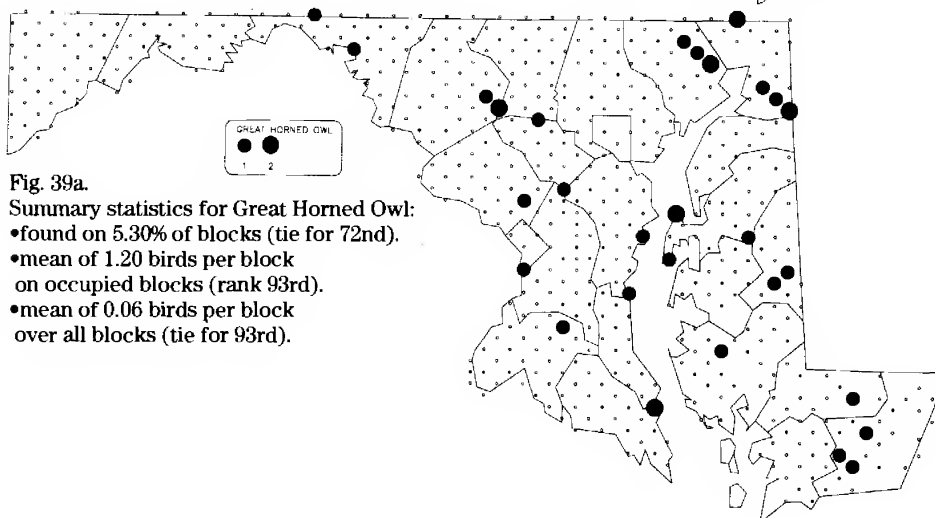


Fig. 39a.

Summary statistics for Great Horned Owl:

- found on 5.30% of blocks (tie for 72nd).
- mean of 1.20 birds per block on occupied blocks (rank 93rd).
- mean of 0.06 birds per block over all blocks (tie for 93rd).

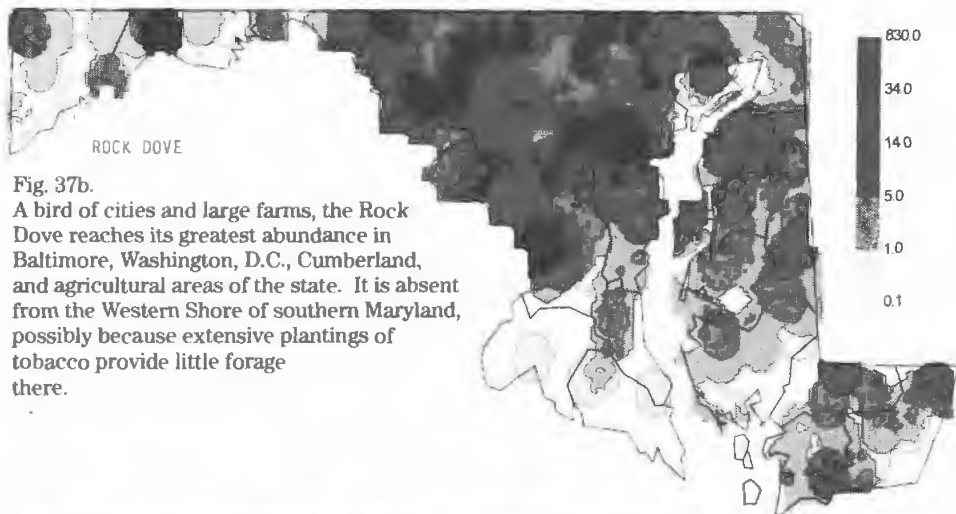


Fig. 37b.

A bird of cities and large farms, the Rock Dove reaches its greatest abundance in Baltimore, Washington, D.C., Cumberland, and agricultural areas of the state. It is absent from the Western Shore of southern Maryland, possibly because extensive plantings of tobacco provide little forage there.

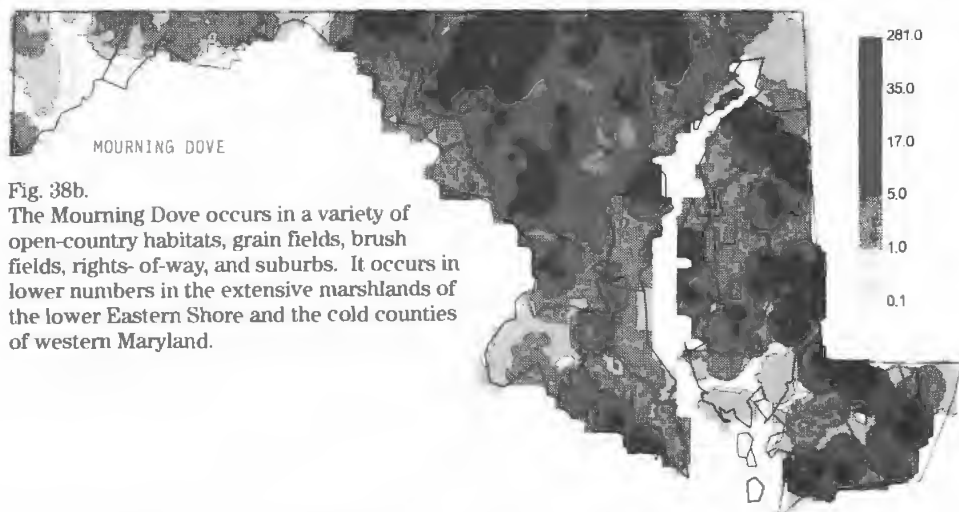


Fig. 38b.

The Mourning Dove occurs in a variety of open-country habitats, grain fields, brush fields, rights-of-way, and suburbs. It occurs in lower numbers in the extensive marshlands of the lower Eastern Shore and the cold counties of western Maryland.

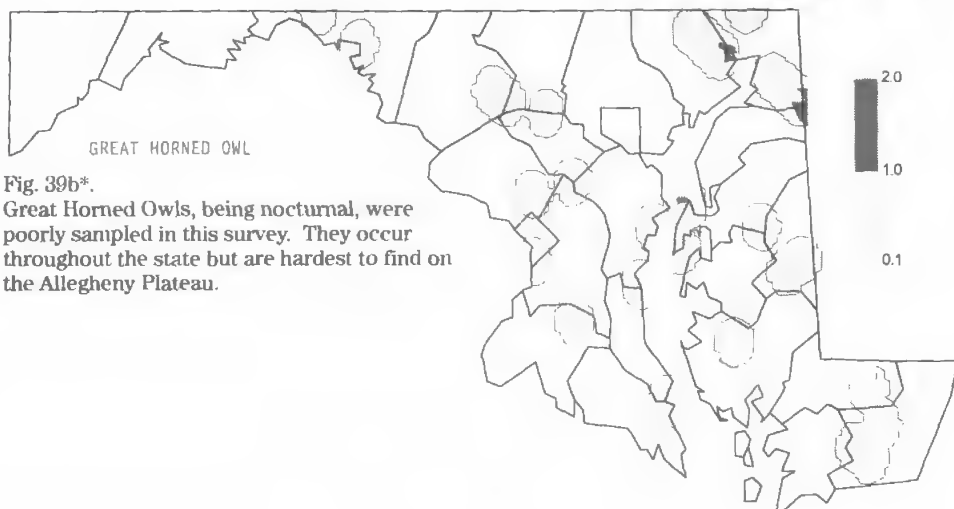


Fig. 39b*.

Great Horned Owls, being nocturnal, were poorly sampled in this survey. They occur throughout the state but are hardest to find on the Allegheny Plateau.

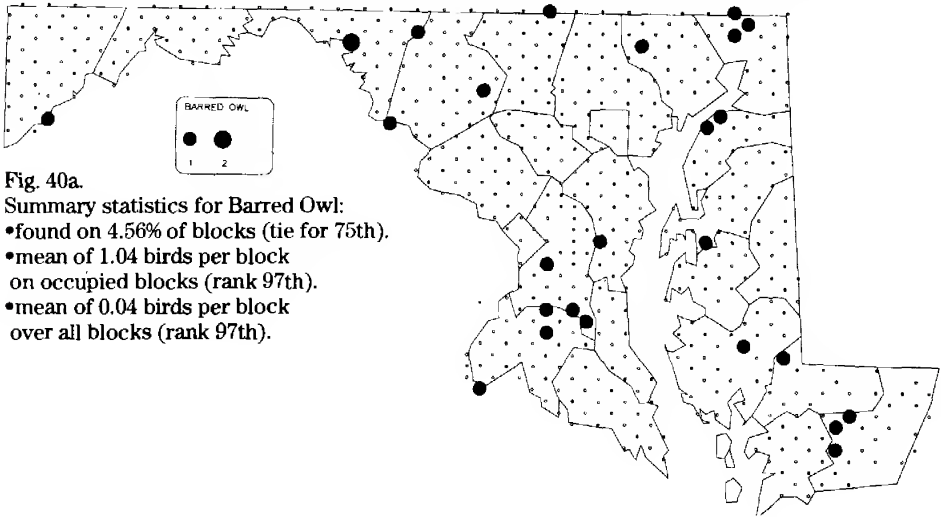


Fig. 40a.

Summary statistics for Barred Owl:

- found on 4.56% of blocks (tie for 75th).
- mean of 1.04 birds per block on occupied blocks (rank 97th).
- mean of 0.04 birds per block over all blocks (rank 97th).

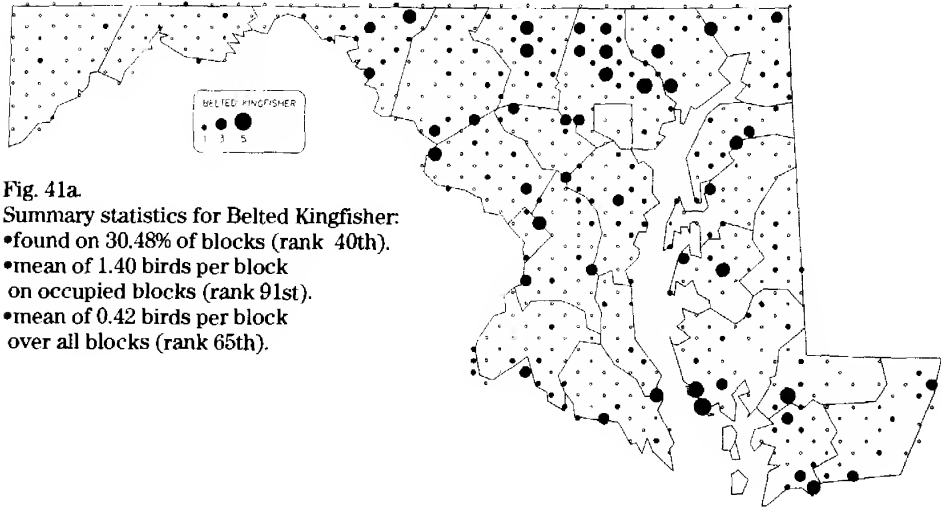


Fig. 41a.

Summary statistics for Belted Kingfisher:

- found on 30.48% of blocks (rank 40th).
- mean of 1.40 birds per block on occupied blocks (rank 91st).
- mean of 0.42 birds per block over all blocks (rank 65th).

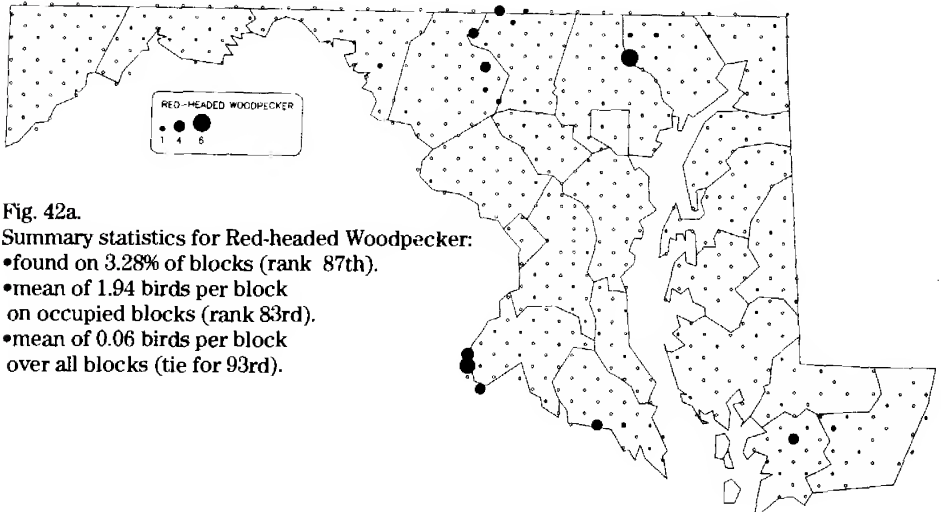


Fig. 42a.

Summary statistics for Red-headed Woodpecker:

- found on 3.28% of blocks (rank 87th).
- mean of 1.94 birds per block on occupied blocks (rank 83rd).
- mean of 0.06 birds per block over all blocks (tie for 93rd).

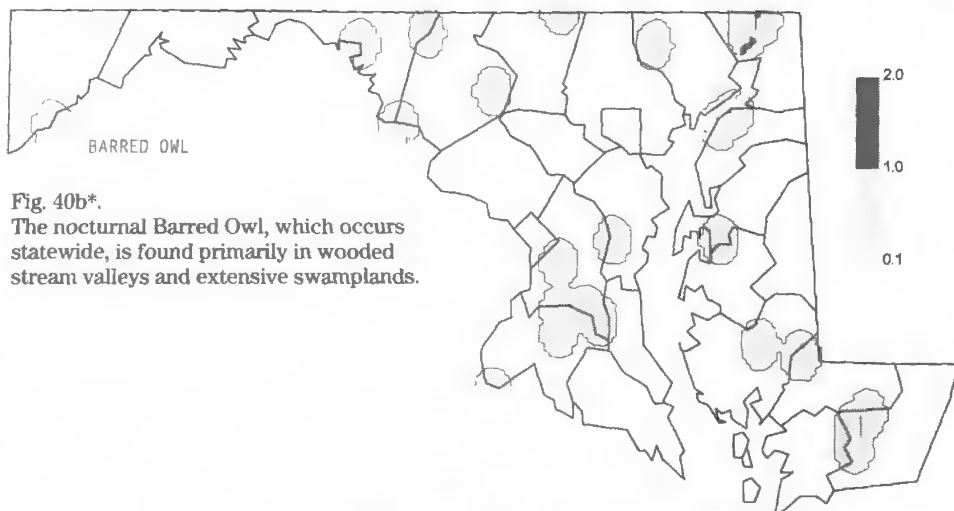


Fig. 40b*.

The nocturnal Barred Owl, which occurs statewide, is found primarily in wooded stream valleys and extensive swamplands.

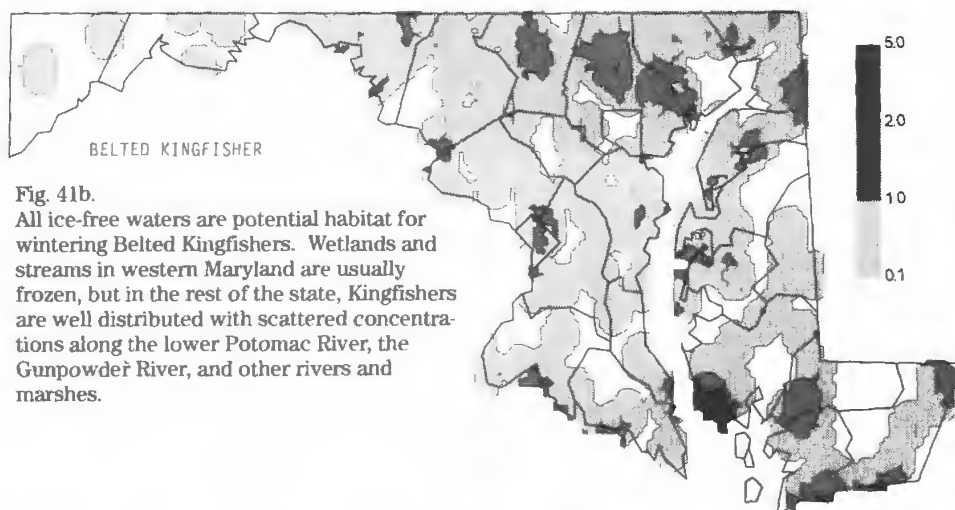


Fig. 41b.

All ice-free waters are potential habitat for wintering Belted Kingfishers. Wetlands and streams in western Maryland are usually frozen, but in the rest of the state, Kingfishers are well distributed with scattered concentrations along the lower Potomac River, the Gunpowder River, and other rivers and marshes.

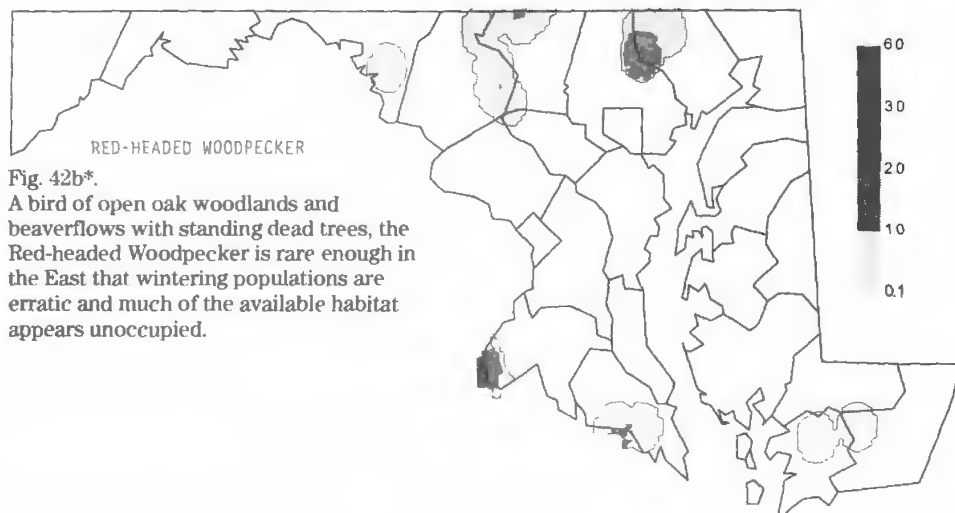


Fig. 42b*.

A bird of open oak woodlands and beaverflows with standing dead trees, the Red-headed Woodpecker is rare enough in the East that wintering populations are erratic and much of the available habitat appears unoccupied.

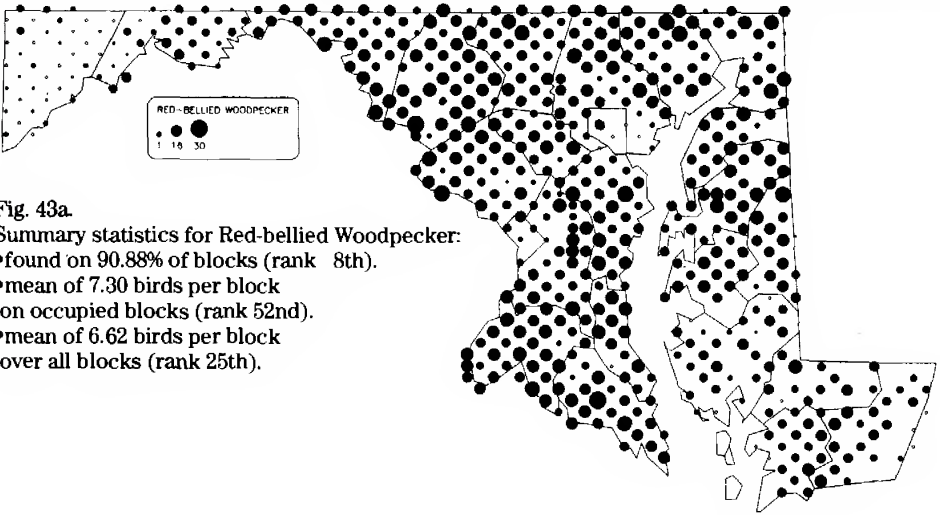


Fig. 43a.
Summary statistics for Red-bellied Woodpecker:
•found on 90.88% of blocks (rank 8th).
•mean of 7.30 birds per block on occupied blocks (rank 52nd).
•mean of 6.62 birds per block over all blocks (rank 25th).

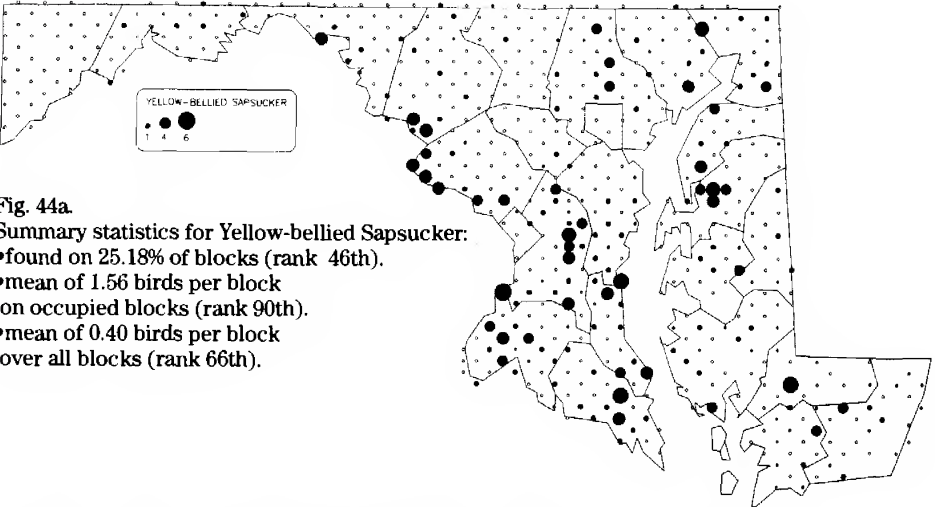


Fig. 44a.
Summary statistics for Yellow-bellied Sapsucker:
•found on 25.18% of blocks (rank 46th).
•mean of 1.56 birds per block on occupied blocks (rank 90th).
•mean of 0.40 birds per block over all blocks (rank 66th).

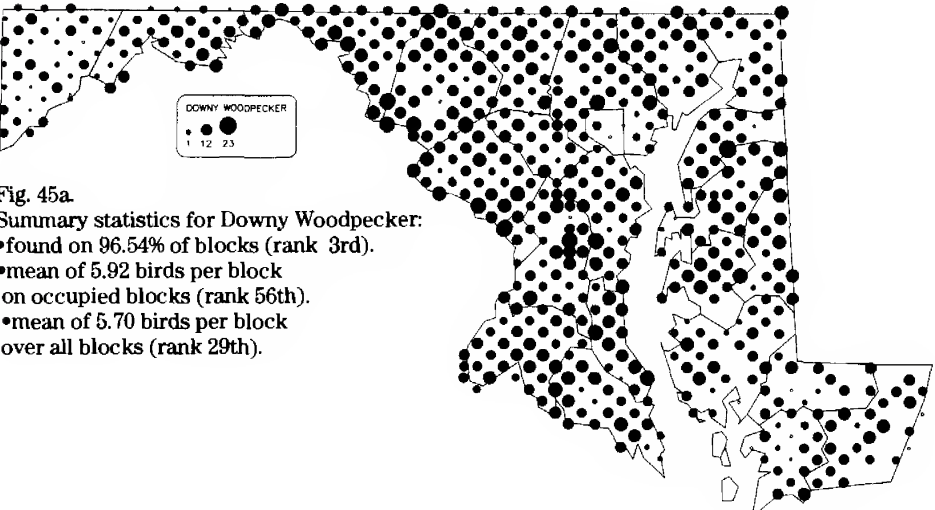
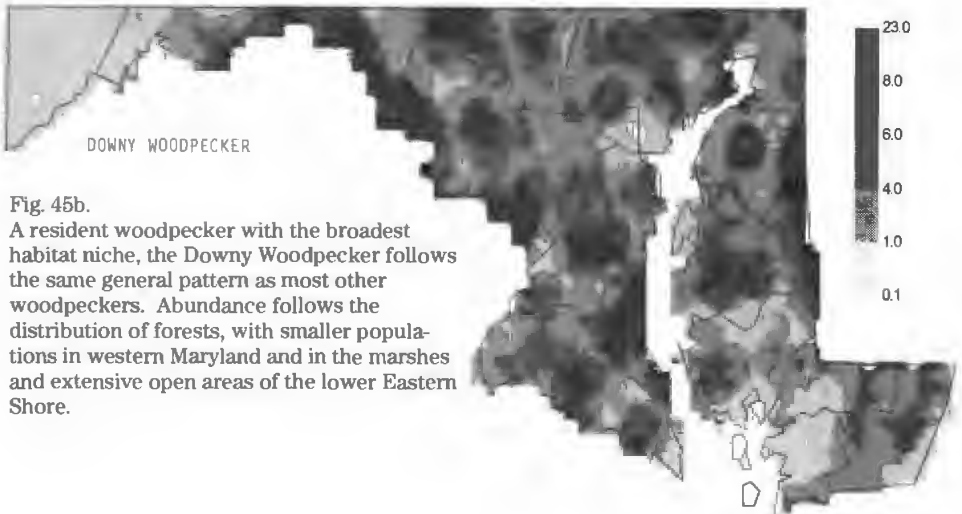
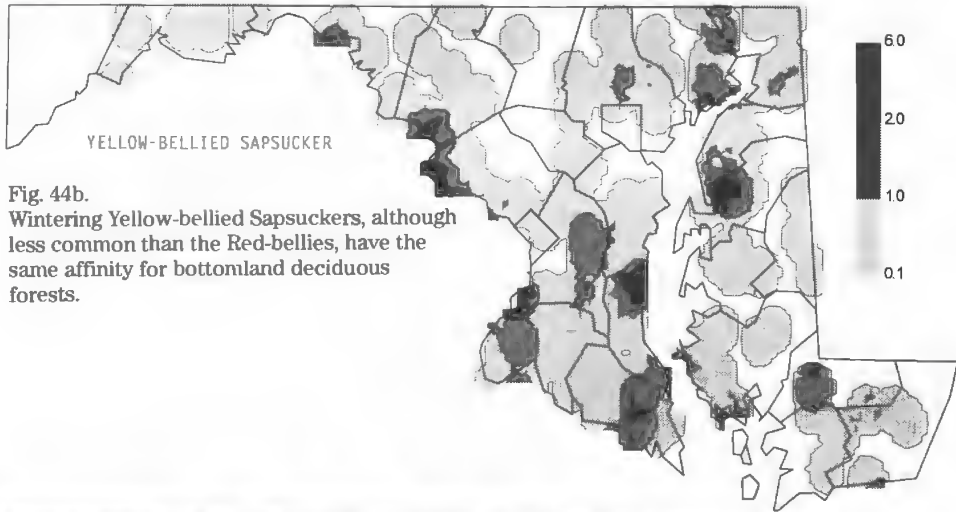
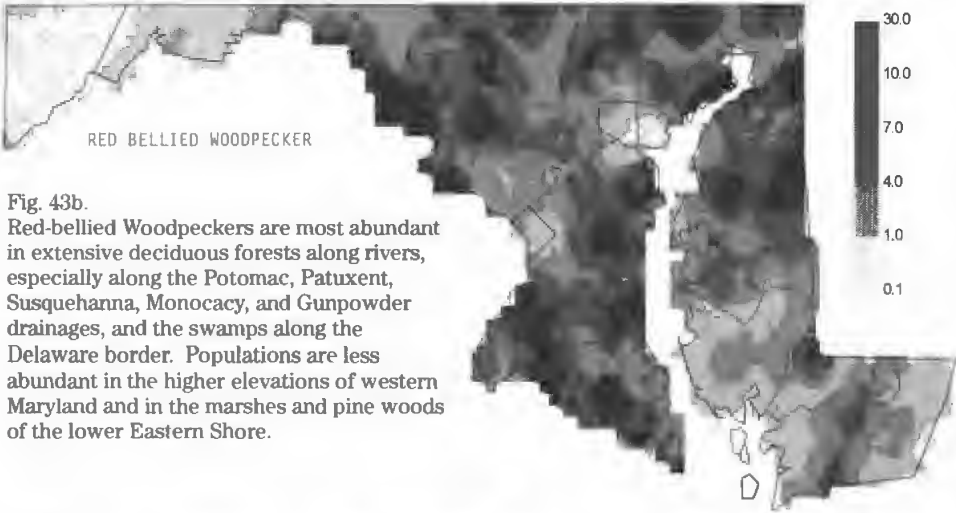


Fig. 45a.
Summary statistics for Downy Woodpecker:
•found on 96.54% of blocks (rank 3rd).
•mean of 5.92 birds per block on occupied blocks (rank 56th).
•mean of 5.70 birds per block over all blocks (rank 29th).



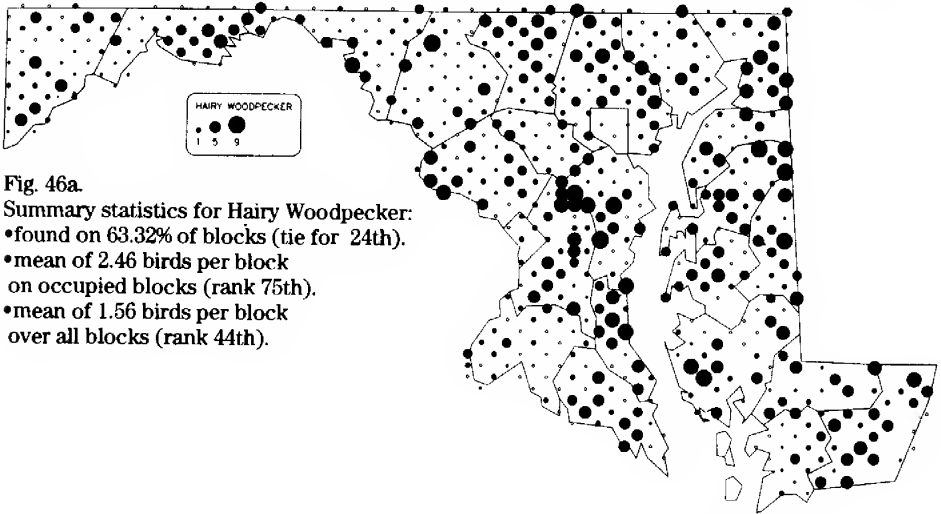


Fig. 46a.

Summary statistics for Hairy Woodpecker:

- found on 63.32% of blocks (tie for 24th).
- mean of 2.46 birds per block on occupied blocks (rank 75th).
- mean of 1.56 birds per block over all blocks (rank 44th).

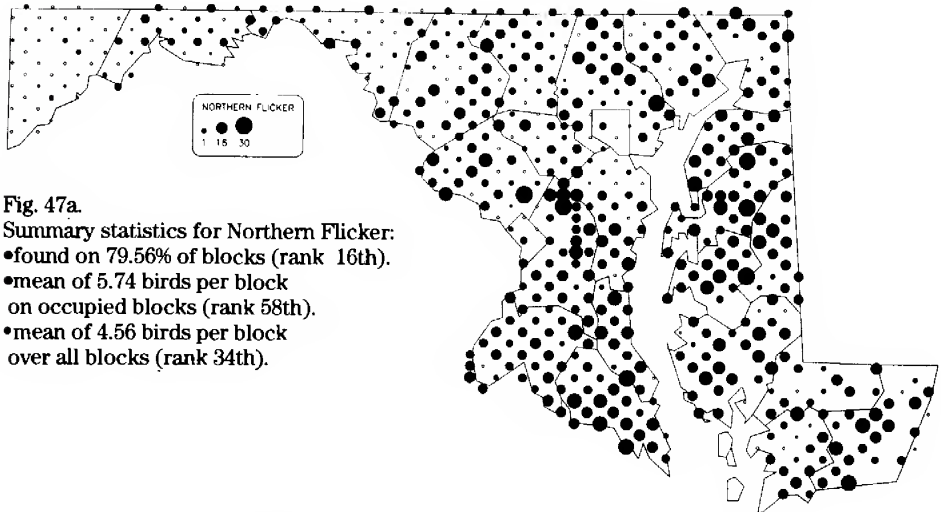


Fig. 47a.

Summary statistics for Northern Flicker:

- found on 79.56% of blocks (rank 16th).
- mean of 5.74 birds per block on occupied blocks (rank 58th).
- mean of 4.56 birds per block over all blocks (rank 34th).

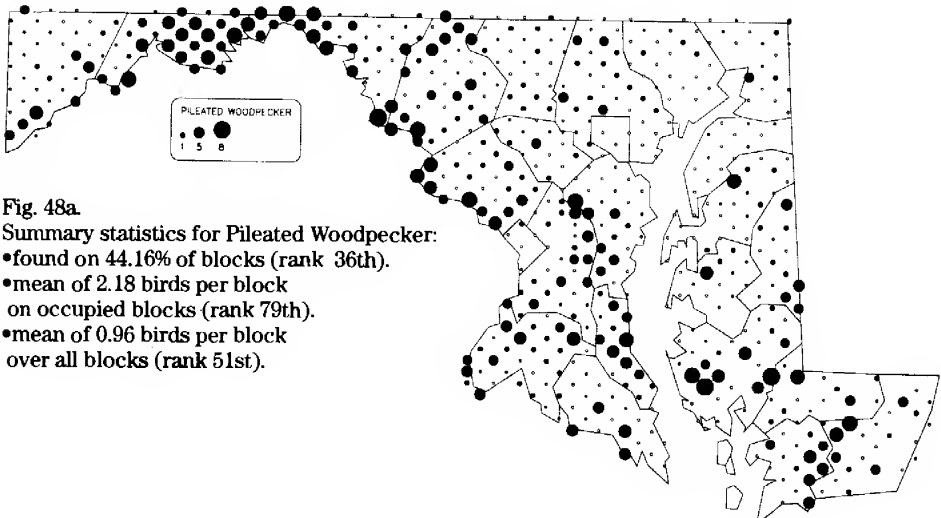


Fig. 48a.

Summary statistics for Pileated Woodpecker:

- found on 44.16% of blocks (rank 36th).
- mean of 2.18 birds per block on occupied blocks (rank 79th).
- mean of 0.96 birds per block over all blocks (rank 51st).

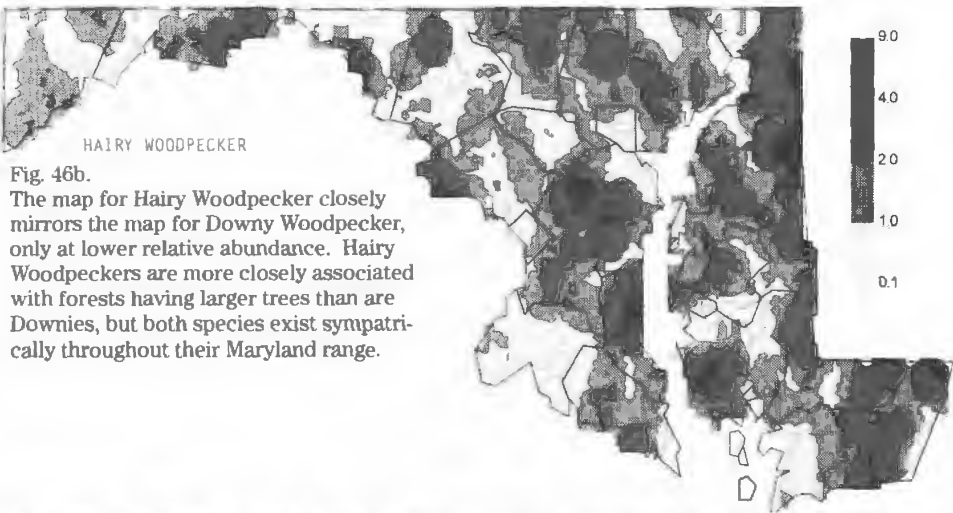


Fig. 46b.

The map for Hairy Woodpecker closely mirrors the map for Downy Woodpecker, only at lower relative abundance. Hairy Woodpeckers are more closely associated with forests having larger trees than are Downies, but both species exist sympatrically throughout their Maryland range.

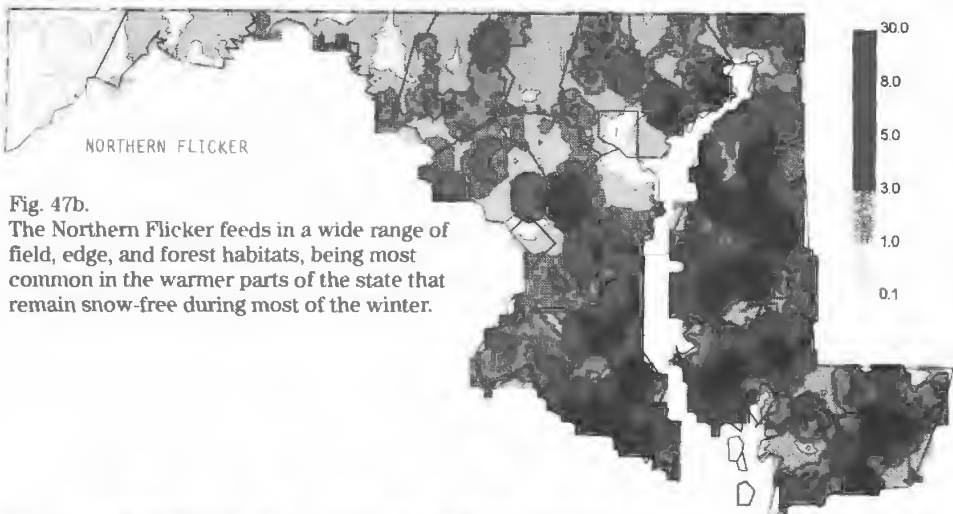


Fig. 47b.

The Northern Flicker feeds in a wide range of field, edge, and forest habitats, being most common in the warmer parts of the state that remain snow-free during most of the winter.

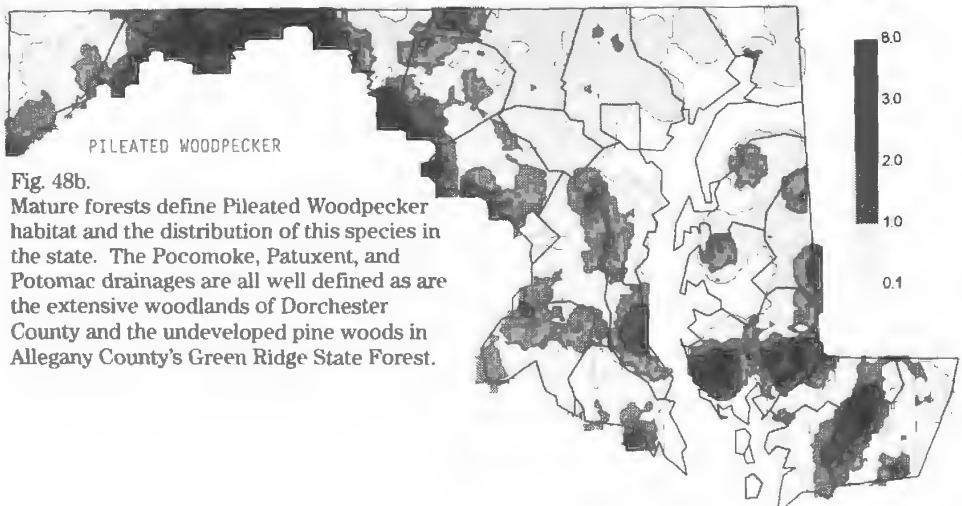


Fig. 48b.

Mature forests define Pileated Woodpecker habitat and the distribution of this species in the state. The Pocomoke, Patuxent, and Potomac drainages are all well defined as are the extensive woodlands of Dorchester County and the undeveloped pine woods in Allegany County's Green Ridge State Forest.

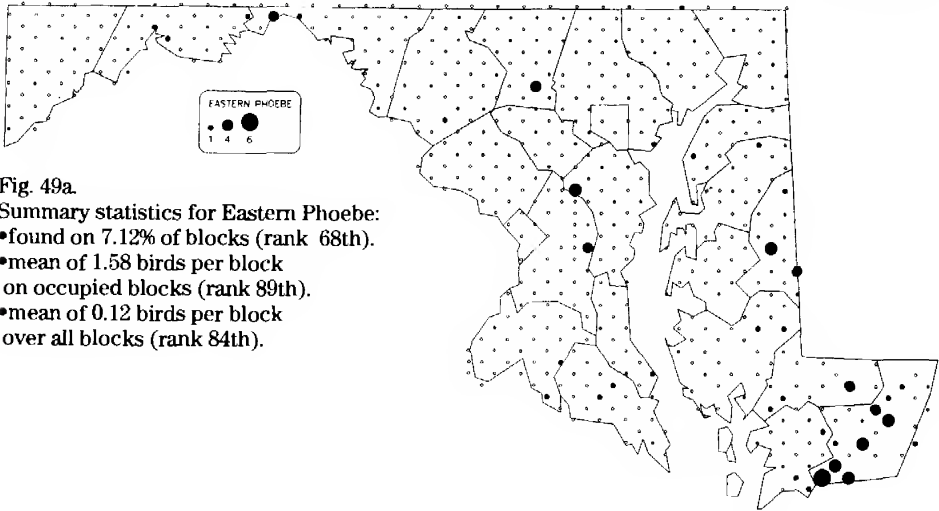


Fig. 49a.

Summary statistics for Eastern Phoebe:

- found on 7.12% of blocks (rank 68th).
- mean of 1.58 birds per block on occupied blocks (rank 89th).
- mean of 0.12 birds per block over all blocks (rank 84th).

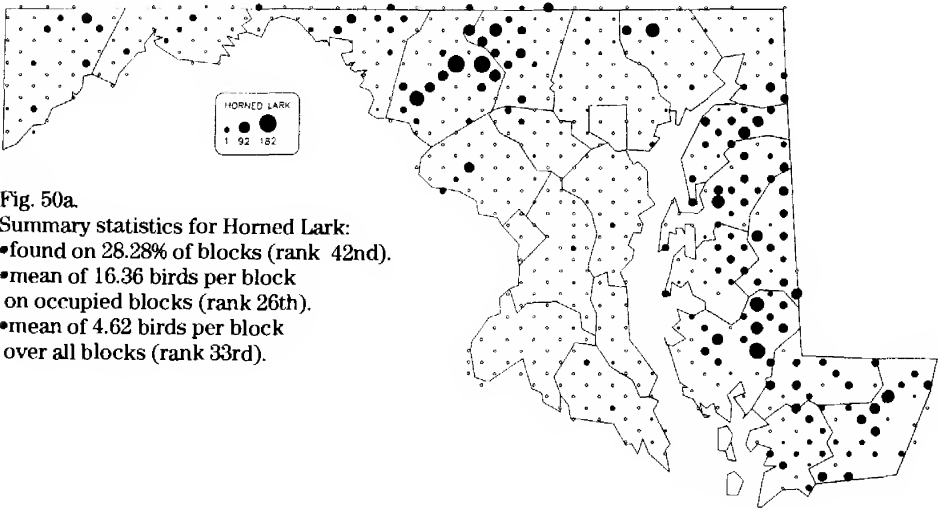


Fig. 50a.

Summary statistics for Horned Lark:

- found on 28.28% of blocks (rank 42nd).
- mean of 16.36 birds per block on occupied blocks (rank 26th).
- mean of 4.62 birds per block over all blocks (rank 33rd).

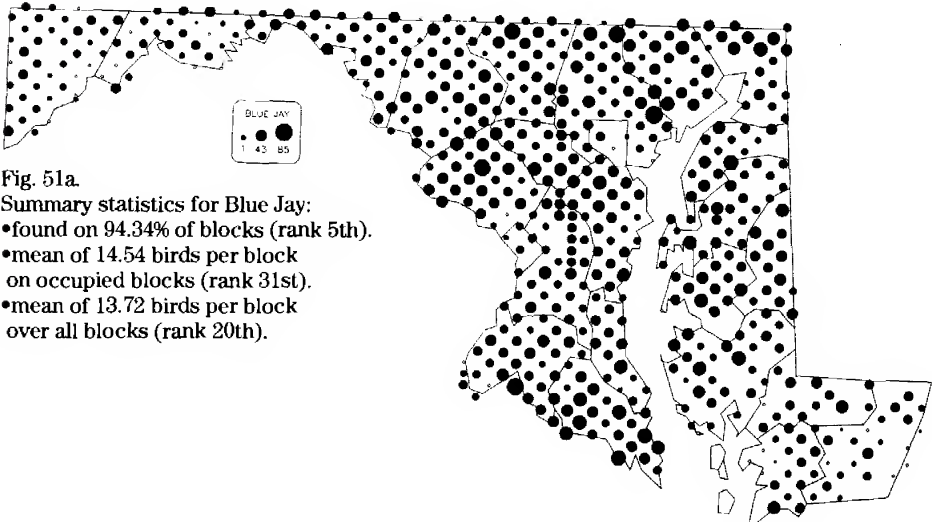


Fig. 51a.

Summary statistics for Blue Jay:

- found on 94.34% of blocks (rank 5th).
- mean of 14.54 birds per block on occupied blocks (rank 31st).
- mean of 13.72 birds per block over all blocks (rank 20th).

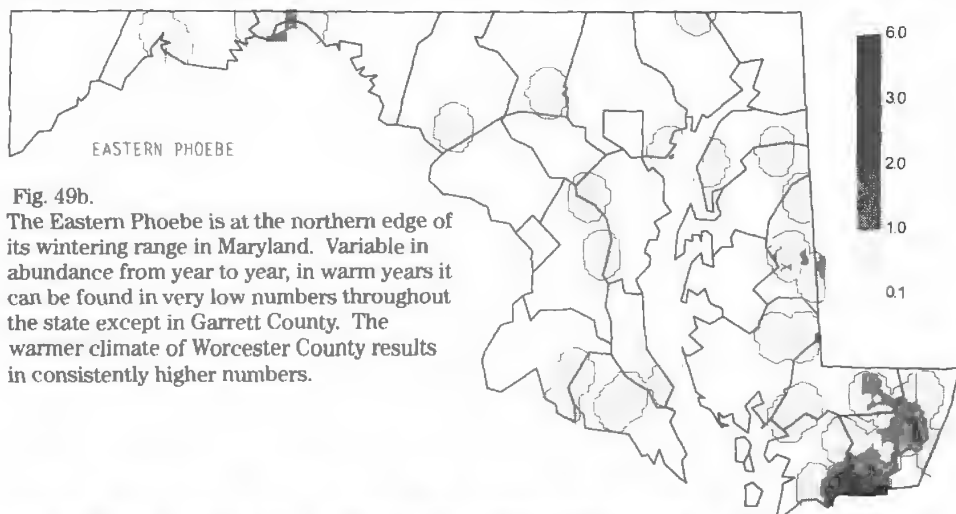


Fig. 49b.

The Eastern Phoebe is at the northern edge of its wintering range in Maryland. Variable in abundance from year to year, in warm years it can be found in very low numbers throughout the state except in Garrett County. The warmer climate of Worcester County results in consistently higher numbers.

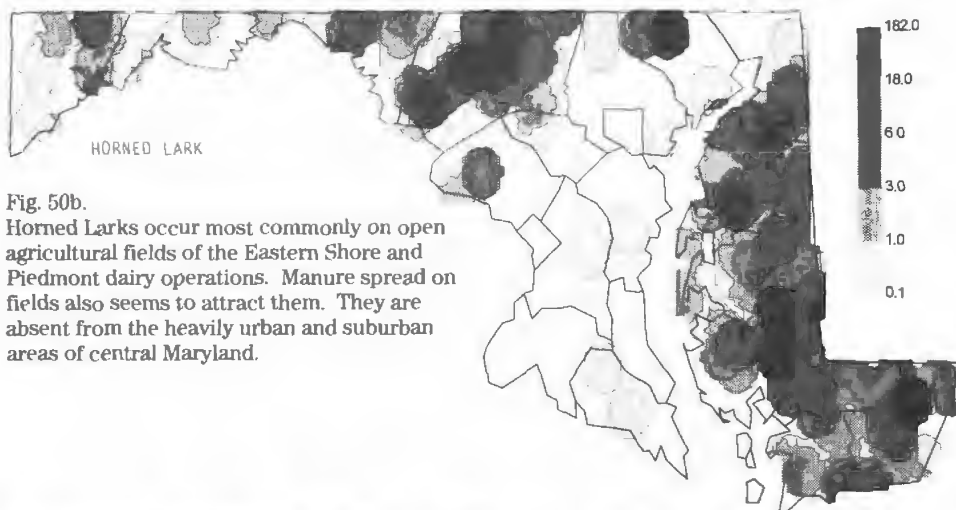


Fig. 50b.

Horned Larks occur most commonly on open agricultural fields of the Eastern Shore and Piedmont dairy operations. Manure spread on fields also seems to attract them. They are absent from the heavily urban and suburban areas of central Maryland.

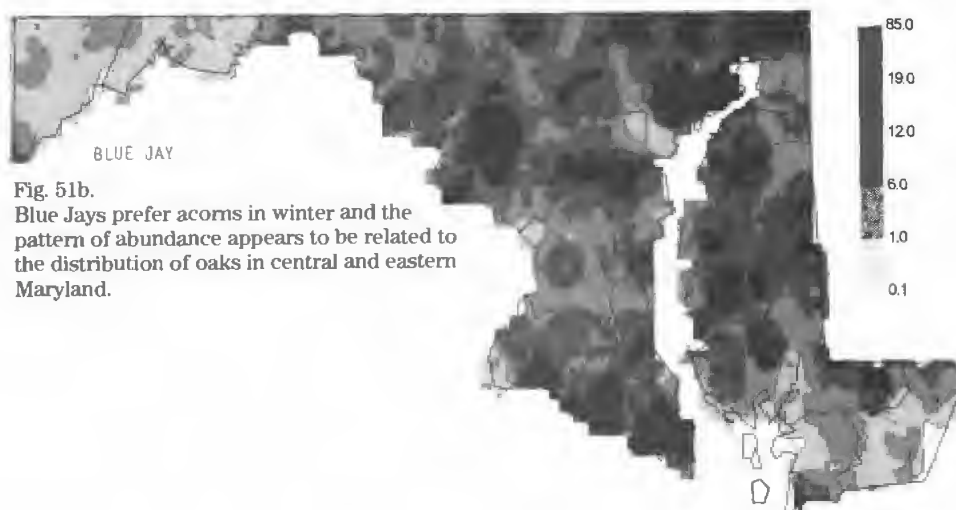


Fig. 51b.

Blue Jays prefer acorns in winter and the pattern of abundance appears to be related to the distribution of oaks in central and eastern Maryland.

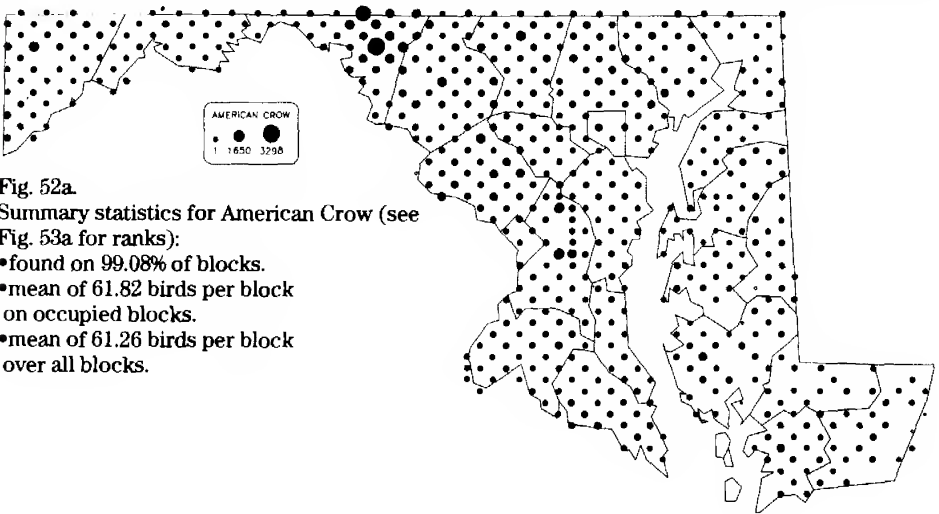


Fig. 52a.

Summary statistics for American Crow (see Fig. 53a for ranks):

- found on 99.08% of blocks.
- mean of 61.82 birds per block on occupied blocks.
- mean of 61.26 birds per block over all blocks.

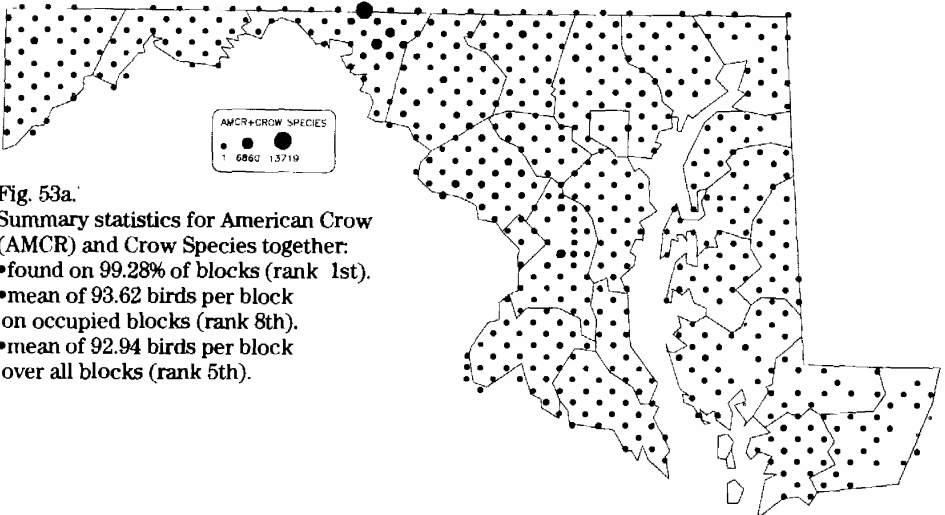


Fig. 53a.

Summary statistics for American Crow (AMCR) and Crow Species together:

- found on 99.28% of blocks (rank 1st).
- mean of 93.62 birds per block on occupied blocks (rank 8th).
- mean of 92.94 birds per block over all blocks (rank 5th).

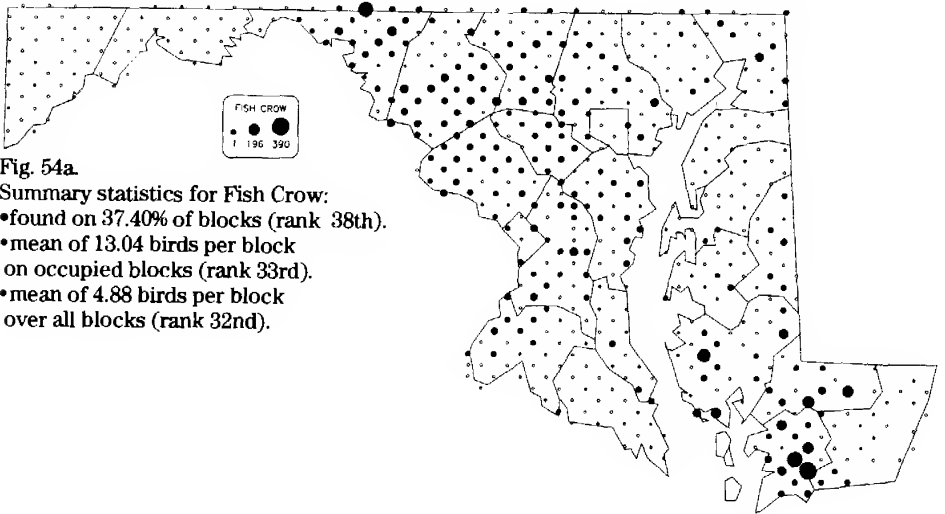
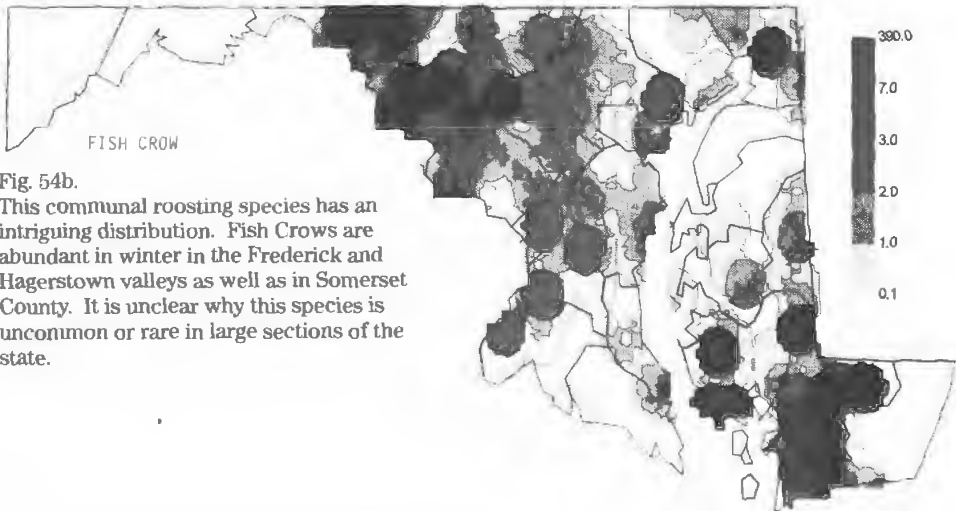
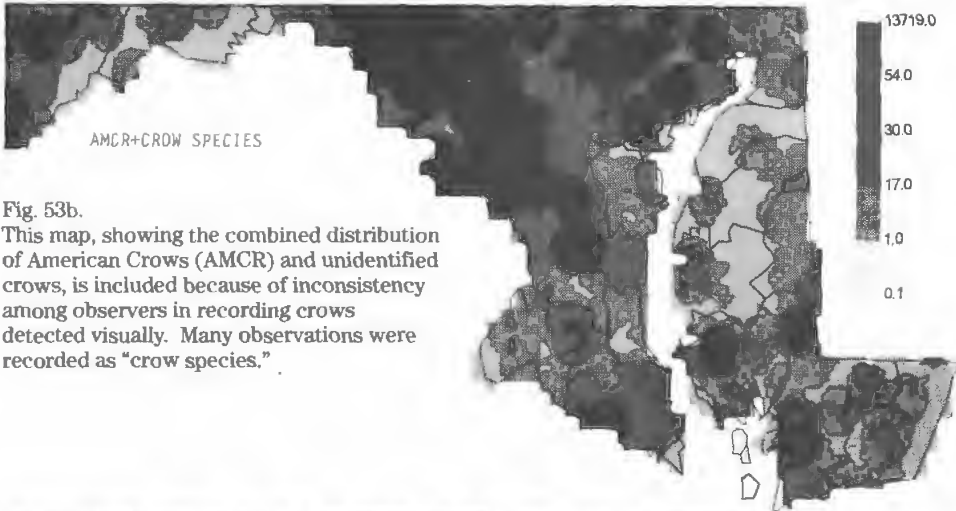
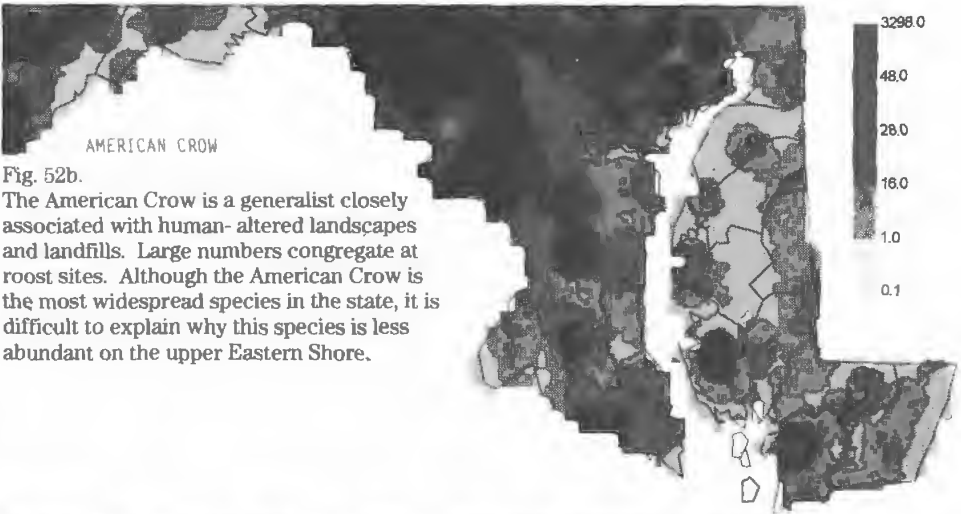


Fig. 54a.

Summary statistics for Fish Crow:

- found on 37.40% of blocks (rank 38th).
- mean of 13.04 birds per block on occupied blocks (rank 33rd).
- mean of 4.88 birds per block over all blocks (rank 32nd).



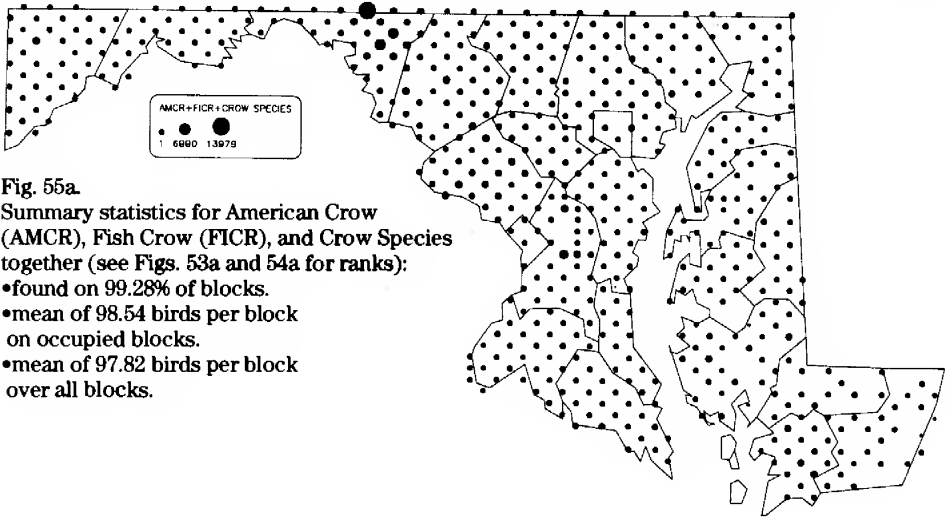


Fig. 55a.

Summary statistics for American Crow (AMCR), Fish Crow (FICR), and Crow Species together (see Figs. 53a and 54a for ranks):

- found on 99.28% of blocks.
- mean of 98.54 birds per block on occupied blocks.
- mean of 97.82 birds per block over all blocks.

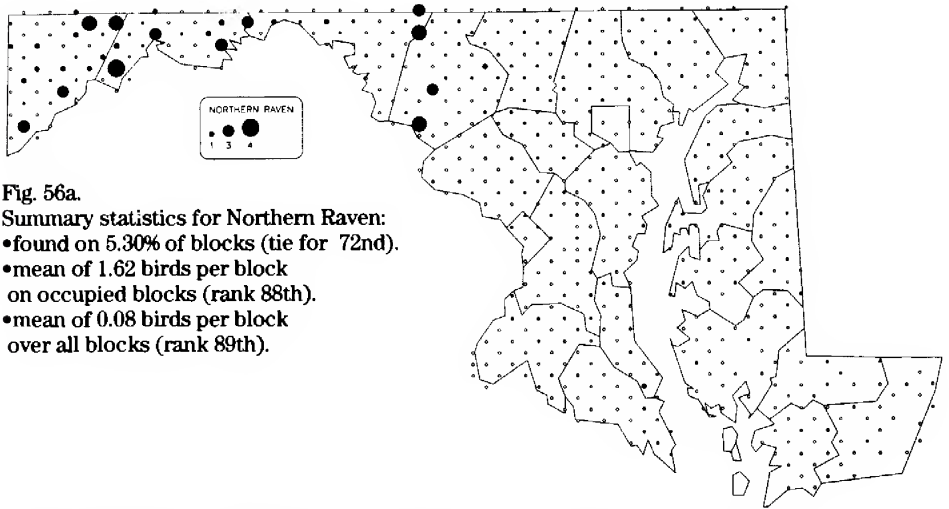


Fig. 56a.

Summary statistics for Northern Raven:

- found on 5.30% of blocks (tie for 72nd).
- mean of 1.62 birds per block on occupied blocks (rank 88th).
- mean of 0.08 birds per block over all blocks (rank 89th).

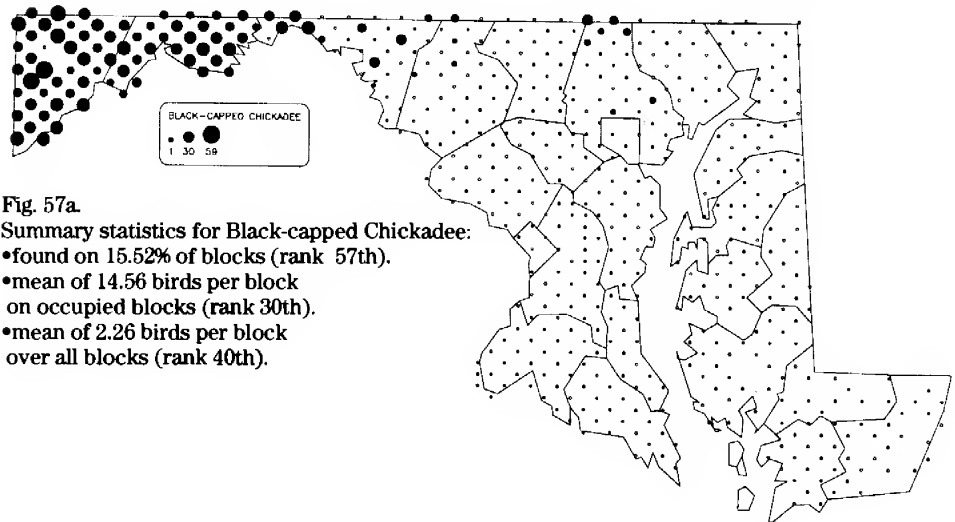


Fig. 57a.

Summary statistics for Black-capped Chickadee:

- found on 15.52% of blocks (rank 57th).
- mean of 14.56 birds per block on occupied blocks (rank 30th).
- mean of 2.26 birds per block over all blocks (rank 40th).

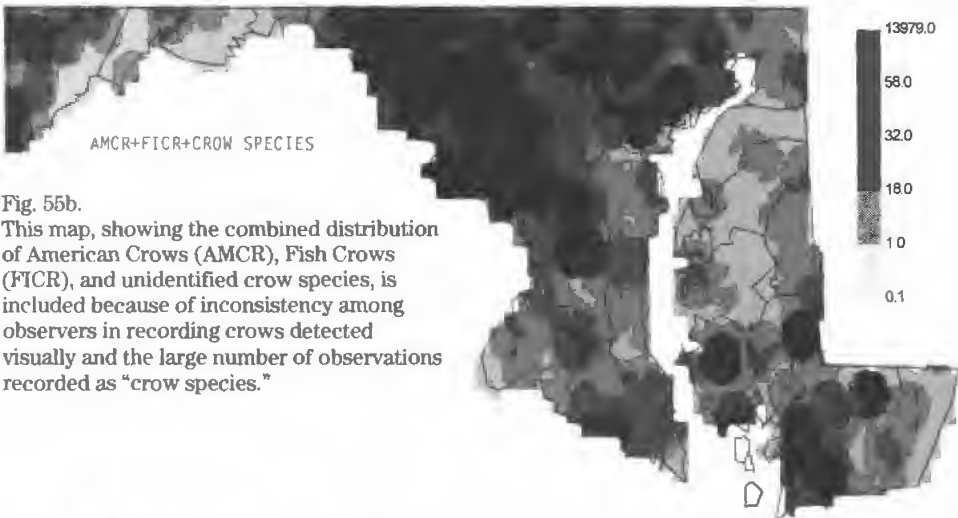


Fig. 55b.
This map, showing the combined distribution of American Crows (AMCR), Fish Crows (FICR), and unidentified crow species, is included because of inconsistency among observers in recording crows detected visually and the large number of observations recorded as “crow species.”

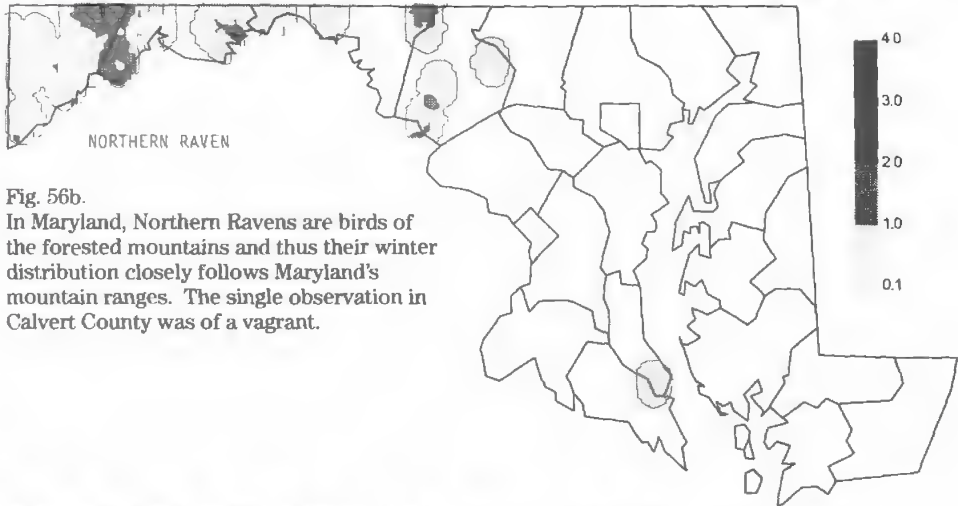


Fig. 56b.
In Maryland, Northern Ravens are birds of the forested mountains and thus their winter distribution closely follows Maryland’s mountain ranges. The single observation in Calvert County was of a vagrant.

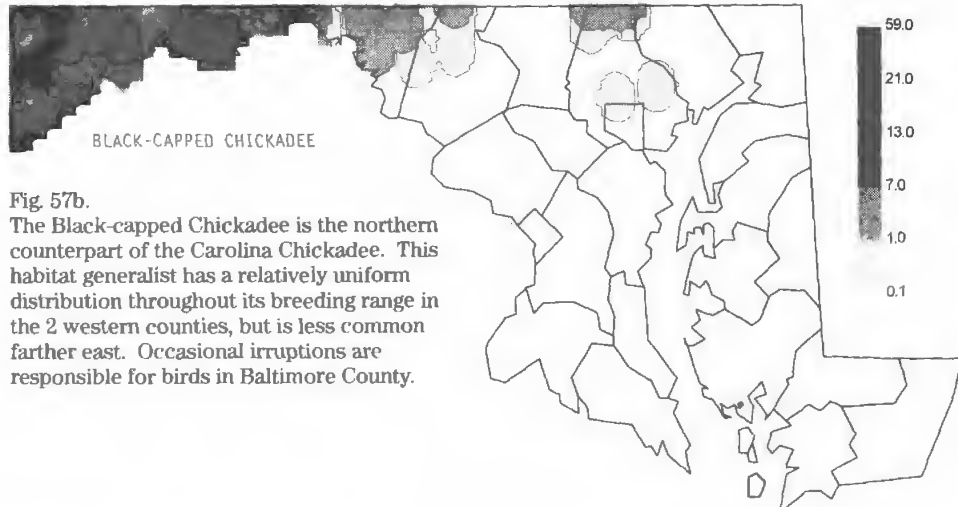


Fig. 57b.
The Black-capped Chickadee is the northern counterpart of the Carolina Chickadee. This habitat generalist has a relatively uniform distribution throughout its breeding range in the 2 western counties, but is less common farther east. Occasional irruptions are responsible for birds in Baltimore County.

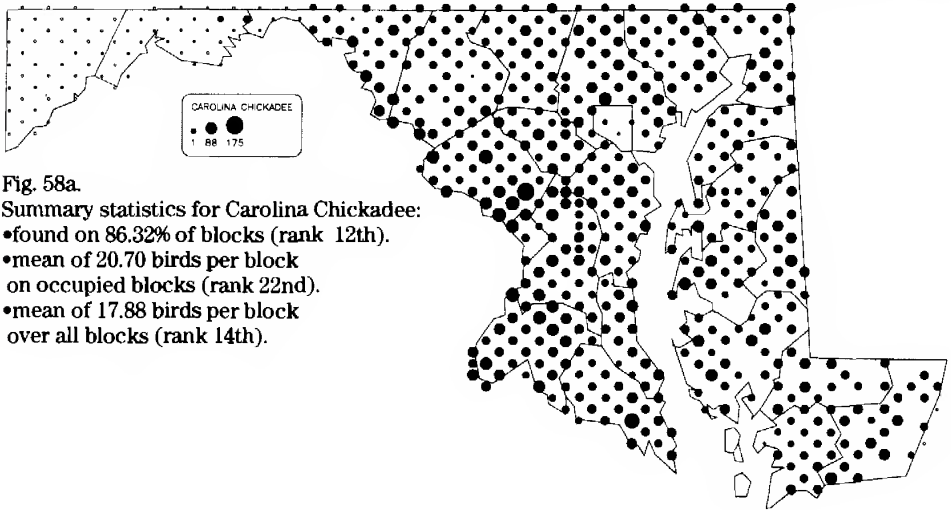


Fig. 58a.

Summary statistics for Carolina Chickadee:

- found on 86.32% of blocks (rank 12th).
- mean of 20.70 birds per block on occupied blocks (rank 22nd).
- mean of 17.88 birds per block over all blocks (rank 14th).

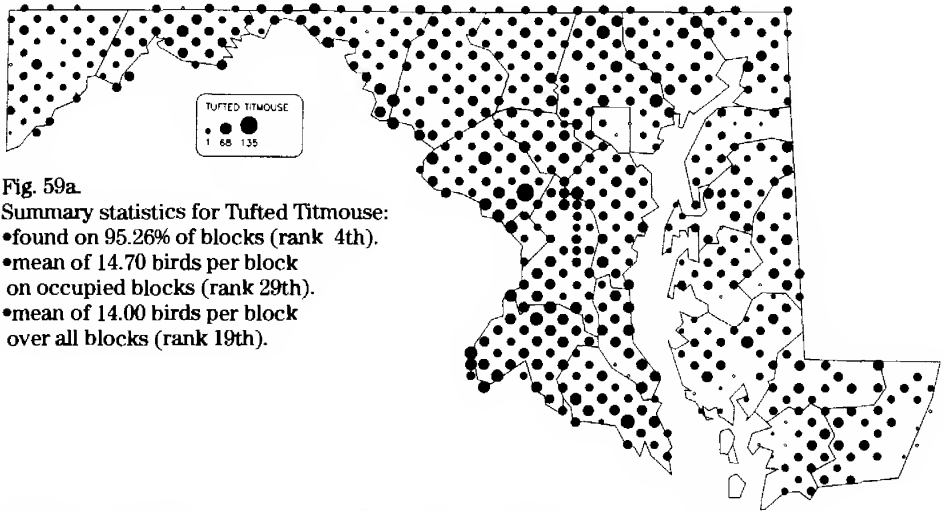


Fig. 59a.

Summary statistics for Tufted Titmouse:

- found on 95.26% of blocks (rank 4th).
- mean of 14.70 birds per block on occupied blocks (rank 29th).
- mean of 14.00 birds per block over all blocks (rank 19th).

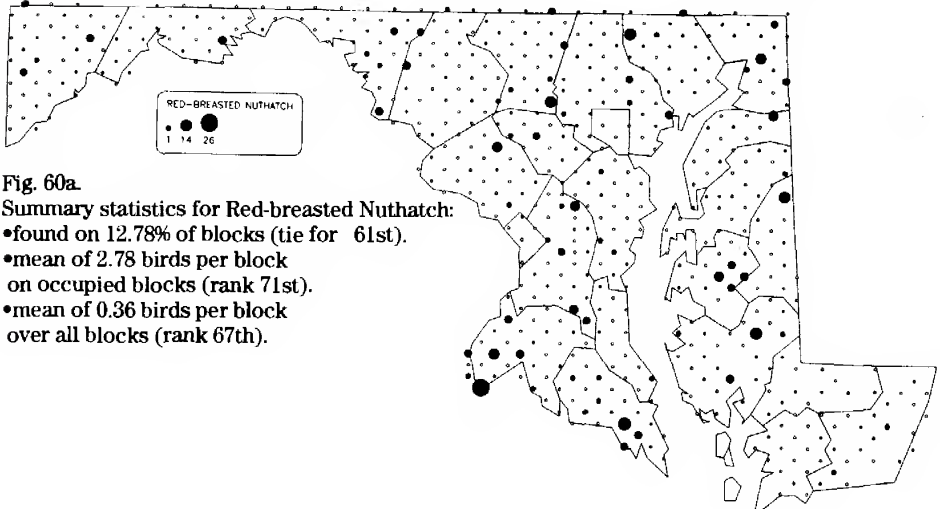


Fig. 60a.

Summary statistics for Red-breasted Nuthatch:

- found on 12.78% of blocks (tie for 61st).
- mean of 2.78 birds per block on occupied blocks (rank 71st).
- mean of 0.36 birds per block over all blocks (rank 67th).

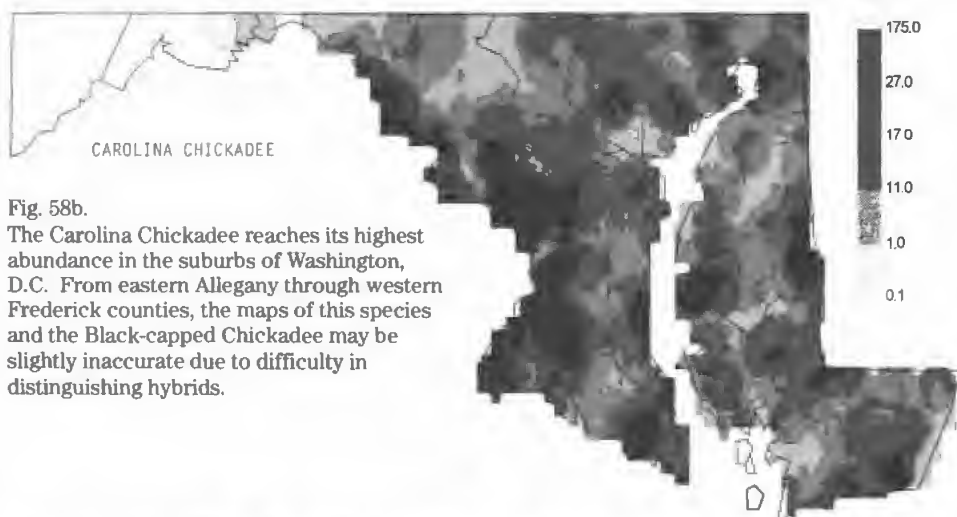


Fig. 58b.

The Carolina Chickadee reaches its highest abundance in the suburbs of Washington, D.C. From eastern Allegany through western Frederick counties, the maps of this species and the Black-capped Chickadee may be slightly inaccurate due to difficulty in distinguishing hybrids.

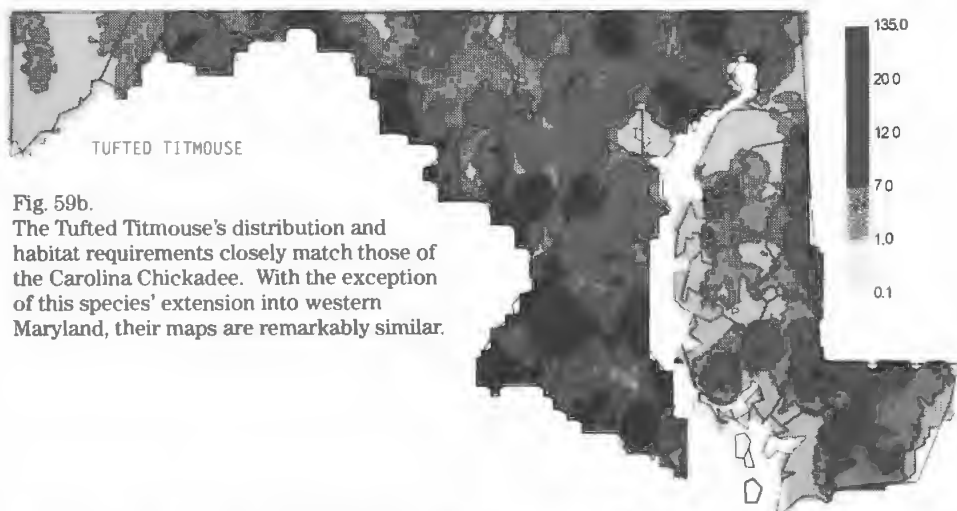


Fig. 59b.

The Tufted Titmouse's distribution and habitat requirements closely match those of the Carolina Chickadee. With the exception of this species' extension into western Maryland, their maps are remarkably similar.

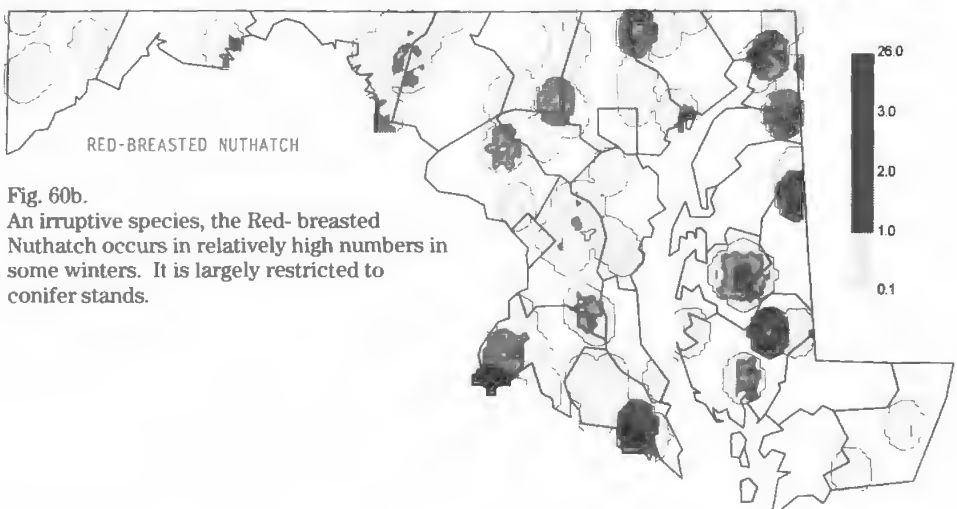


Fig. 60b.

An irruptive species, the Red-breasted Nuthatch occurs in relatively high numbers in some winters. It is largely restricted to conifer stands.

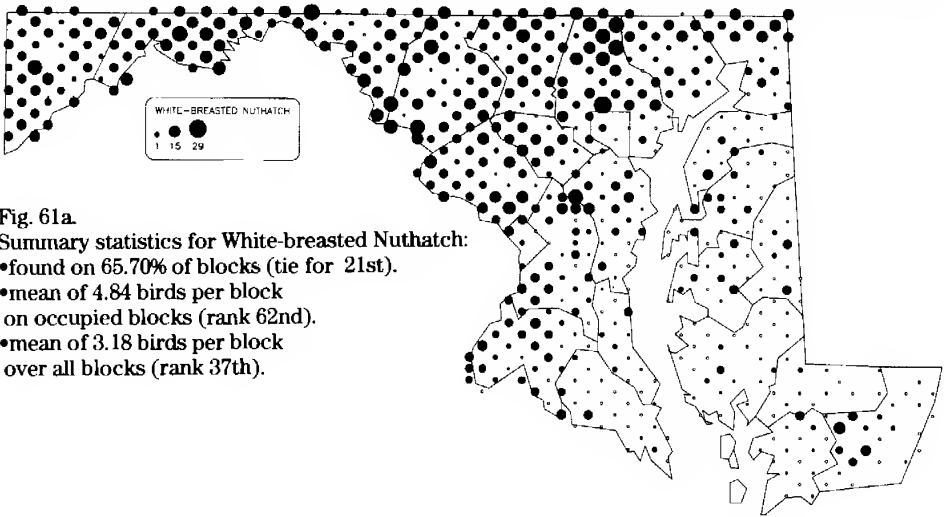


Fig. 61a.

Summary statistics for White-breasted Nuthatch:

- found on 65.70% of blocks (tie for 21st).
- mean of 4.84 birds per block on occupied blocks (rank 62nd).
- mean of 3.18 birds per block over all blocks (rank 37th).

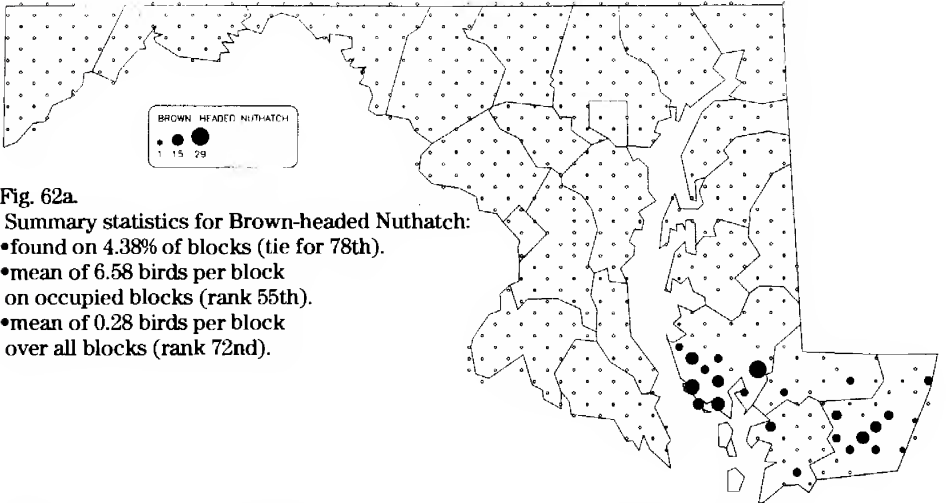


Fig. 62a.

Summary statistics for Brown-headed Nuthatch:

- found on 4.38% of blocks (tie for 78th).
- mean of 6.58 birds per block on occupied blocks (rank 55th).
- mean of 0.28 birds per block over all blocks (rank 72nd).

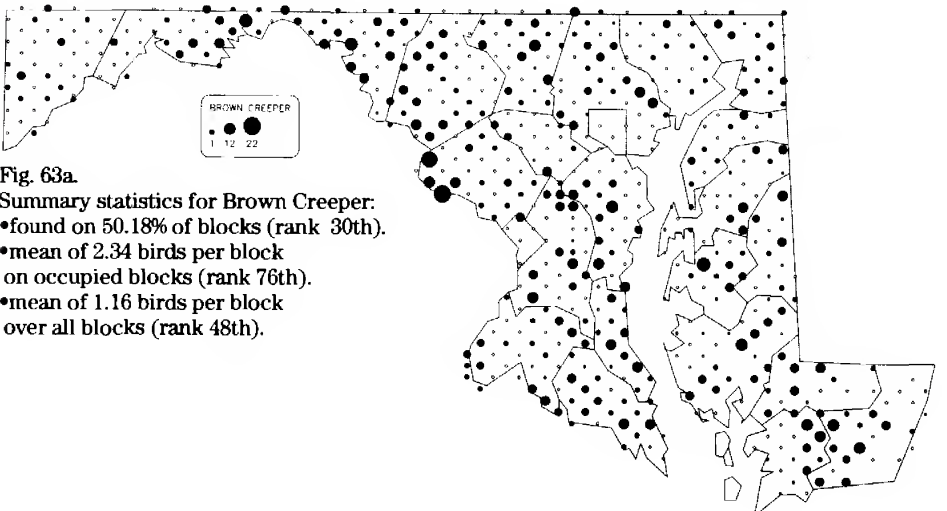


Fig. 63a.

Summary statistics for Brown Creeper:

- found on 50.18% of blocks (rank 30th).
- mean of 2.34 birds per block on occupied blocks (rank 76th).
- mean of 1.16 birds per block over all blocks (rank 48th).

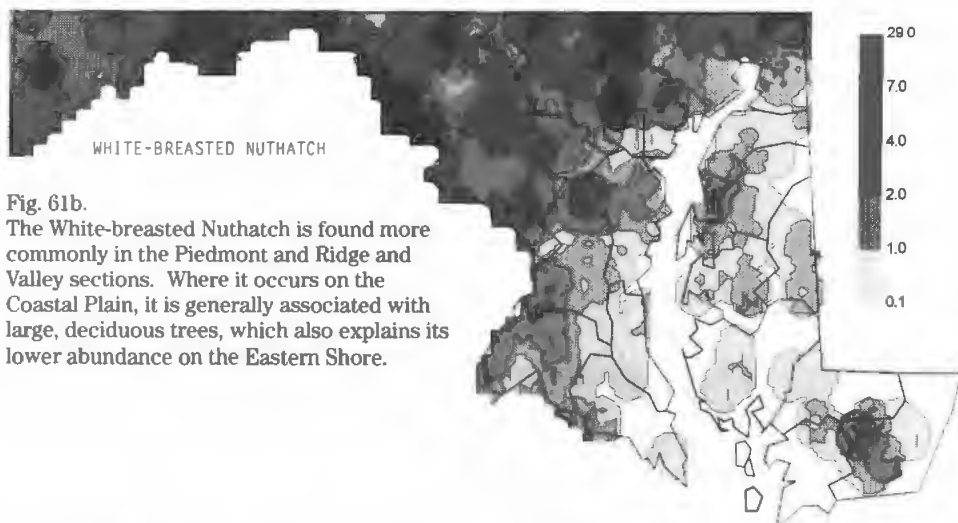


Fig. 61b.

The White-breasted Nuthatch is found more commonly in the Piedmont and Ridge and Valley sections. Where it occurs on the Coastal Plain, it is generally associated with large, deciduous trees, which also explains its lower abundance on the Eastern Shore.

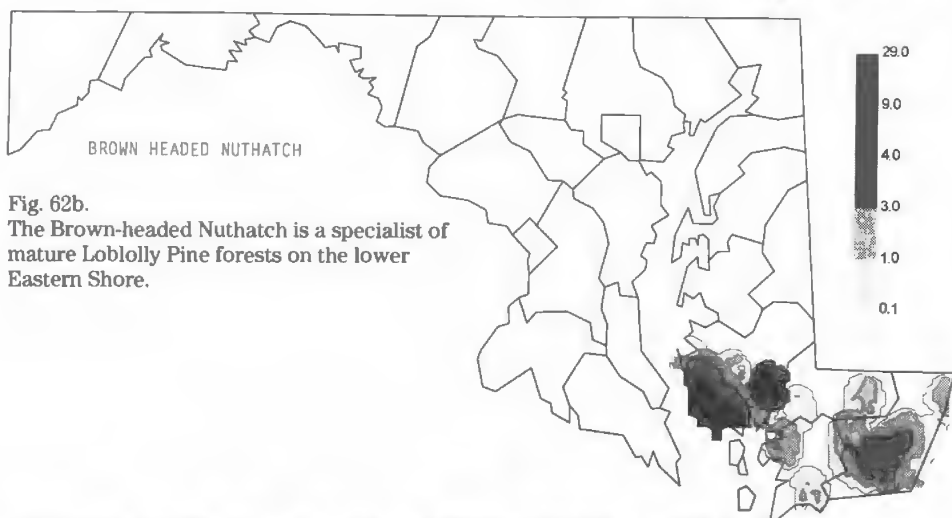


Fig. 62b.

The Brown-headed Nuthatch is a specialist of mature Loblolly Pine forests on the lower Eastern Shore.

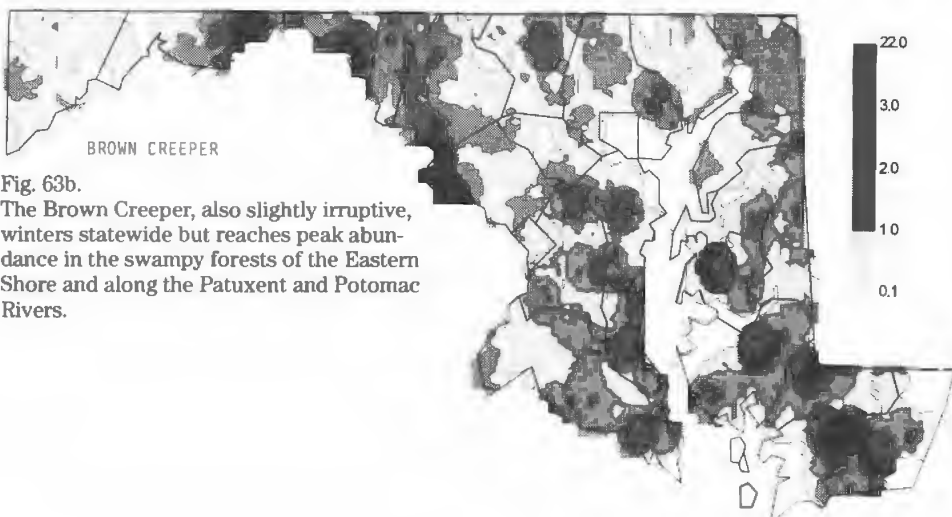


Fig. 63b.

The Brown Creeper, also slightly irruptive, winters statewide but reaches peak abundance in the swampy forests of the Eastern Shore and along the Patuxent and Potomac Rivers.

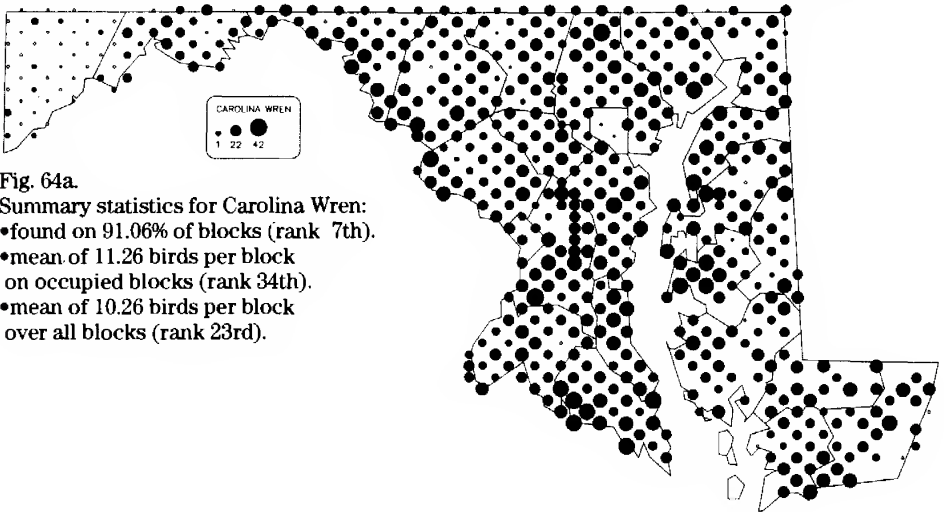


Fig. 64a.

Summary statistics for Carolina Wren:

- found on 91.06% of blocks (rank 7th).
- mean of 11.26 birds per block on occupied blocks (rank 34th).
- mean of 10.26 birds per block over all blocks (rank 23rd).

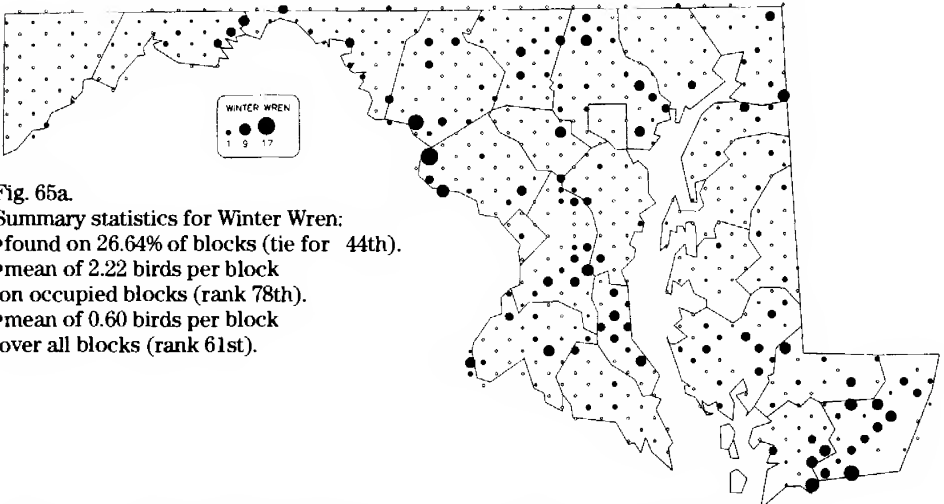


Fig. 65a.

Summary statistics for Winter Wren:

- found on 26.64% of blocks (tie for 44th).
- mean of 2.22 birds per block on occupied blocks (rank 78th).
- mean of 0.60 birds per block over all blocks (rank 61st).

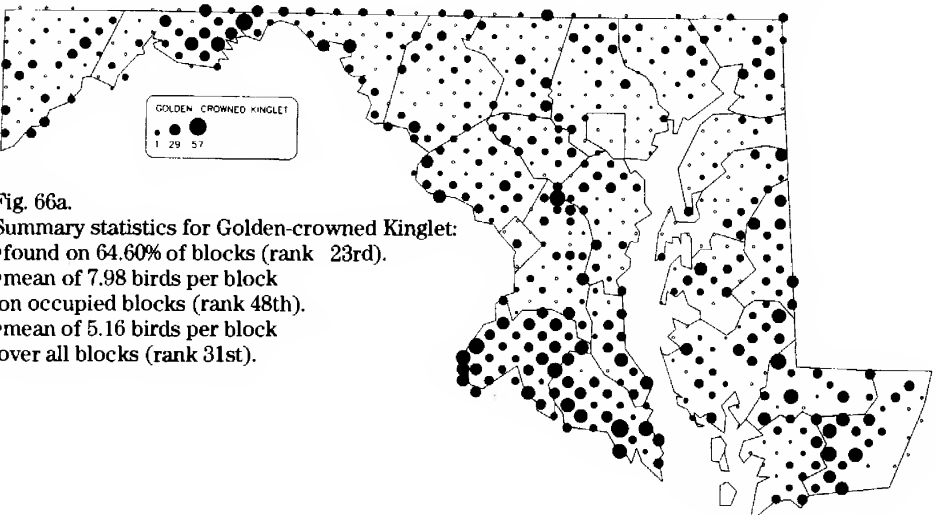


Fig. 66a.

Summary statistics for Golden-crowned Kinglet:

- found on 64.60% of blocks (rank 23rd).
- mean of 7.98 birds per block on occupied blocks (rank 48th).
- mean of 5.16 birds per block over all blocks (rank 31st).

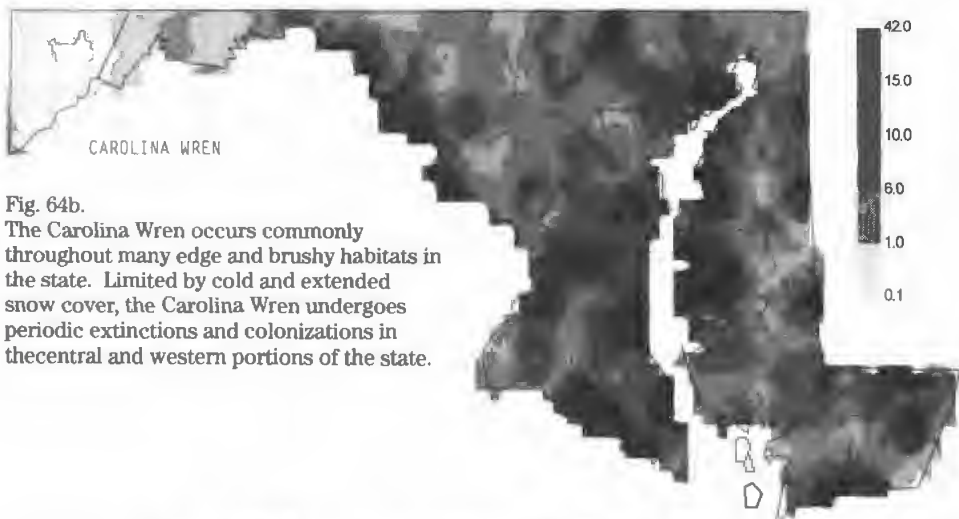


Fig. 64b.
The Carolina Wren occurs commonly throughout many edge and brushy habitats in the state. Limited by cold and extended snow cover, the Carolina Wren undergoes periodic extinctions and colonizations in the central and western portions of the state.

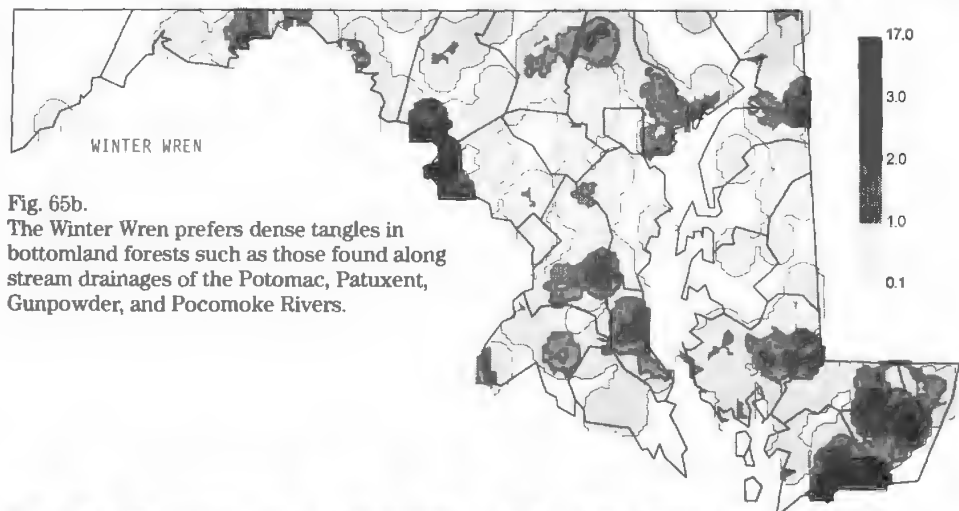


Fig. 65b.
The Winter Wren prefers dense tangles in bottomland forests such as those found along stream drainages of the Potomac, Patuxent, Gunpowder, and Pocomoke Rivers.

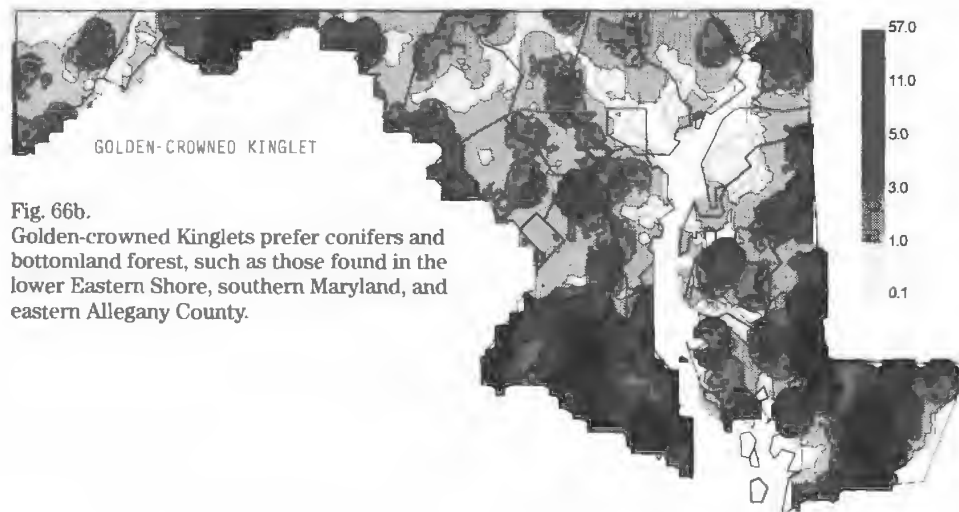


Fig. 66b.
Golden-crowned Kinglets prefer conifers and bottomland forest, such as those found in the lower Eastern Shore, southern Maryland, and eastern Allegany County.

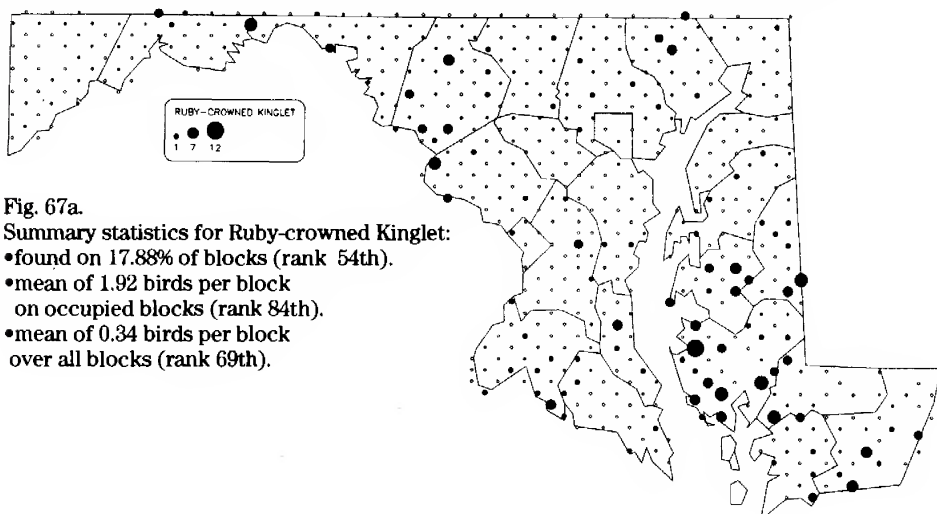


Fig. 67a.

Summary statistics for Ruby-crowned Kinglet:

- found on 17.88% of blocks (rank 54th).
- mean of 1.92 birds per block on occupied blocks (rank 84th).
- mean of 0.34 birds per block over all blocks (rank 69th).

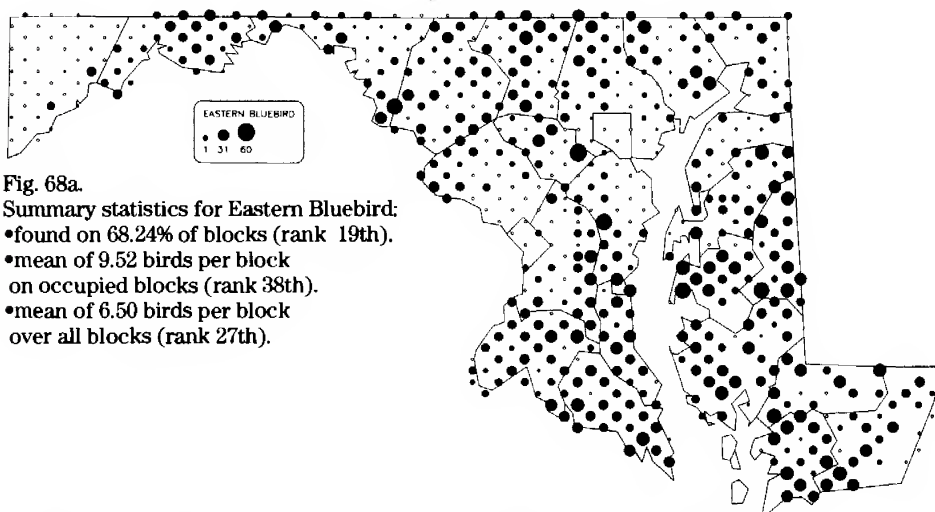


Fig. 68a.

Summary statistics for Eastern Bluebird:

- found on 68.24% of blocks (rank 19th).
- mean of 9.52 birds per block on occupied blocks (rank 38th).
- mean of 6.50 birds per block over all blocks (rank 27th).

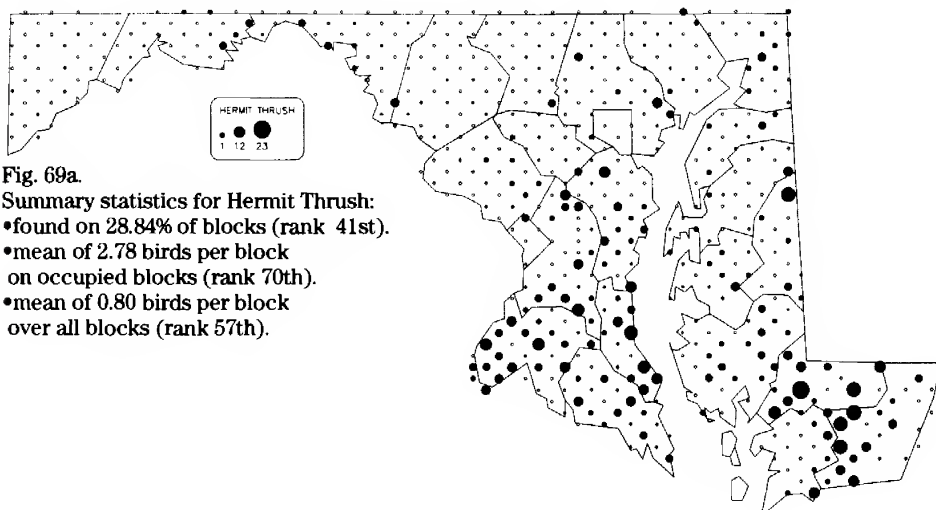


Fig. 69a.

Summary statistics for Hermit Thrush:

- found on 28.84% of blocks (rank 41st).
- mean of 2.78 birds per block on occupied blocks (rank 70th).
- mean of 0.80 birds per block over all blocks (rank 57th).

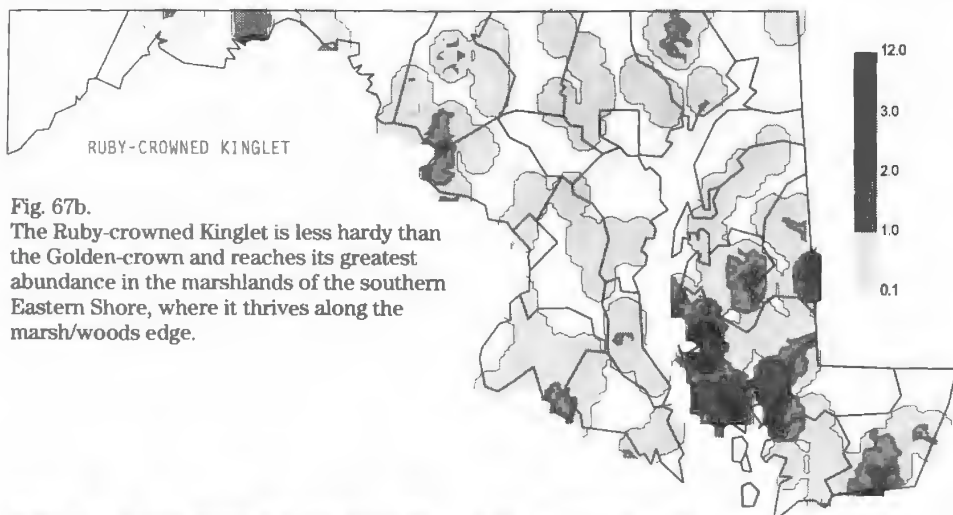


Fig. 67b.

The Ruby-crowned Kinglet is less hardy than the Golden-crown and reaches its greatest abundance in the marshlands of the southern Eastern Shore, where it thrives along the marsh/woods edge.

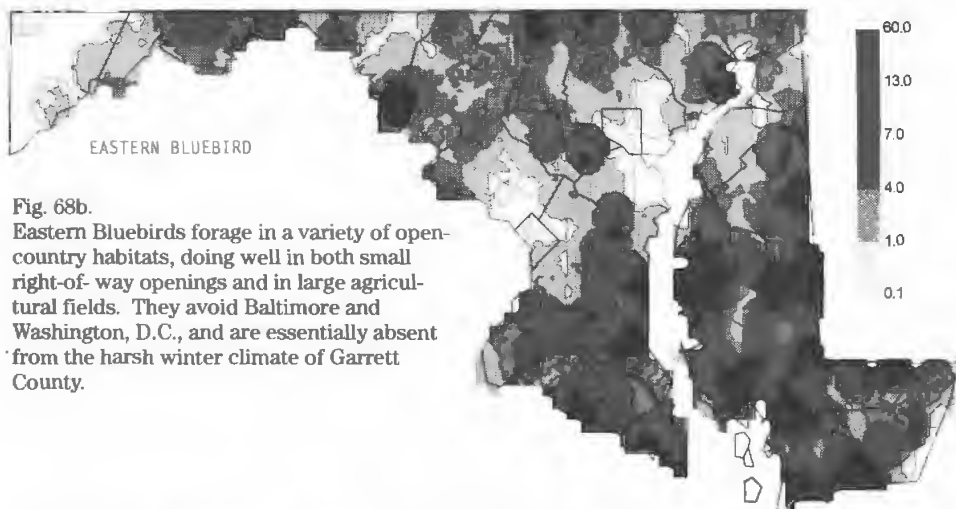


Fig. 68b.

Eastern Bluebirds forage in a variety of open-country habitats, doing well in both small right-of-way openings and in large agricultural fields. They avoid Baltimore and Washington, D.C., and are essentially absent from the harsh winter climate of Garrett County.

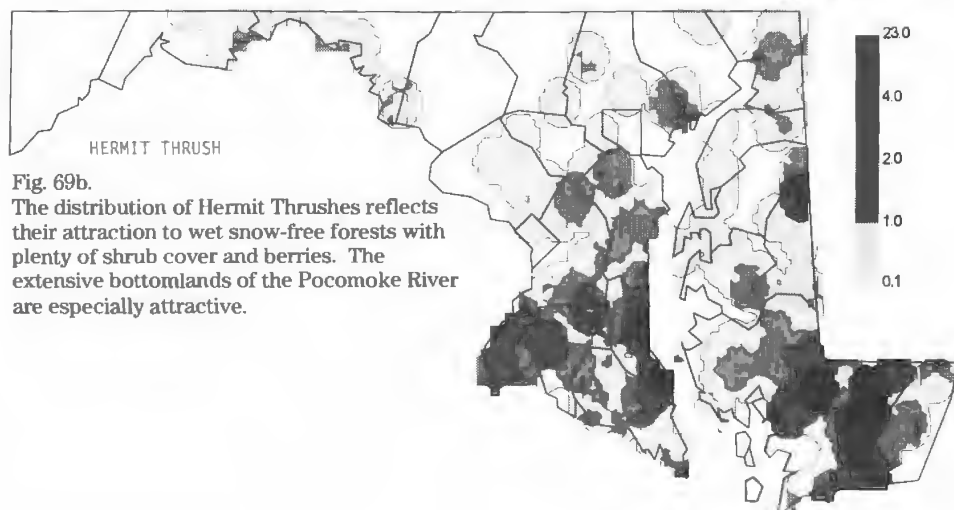


Fig. 69b.

The distribution of Hermit Thrushes reflects their attraction to wet snow-free forests with plenty of shrub cover and berries. The extensive bottomlands of the Pocomoke River are especially attractive.

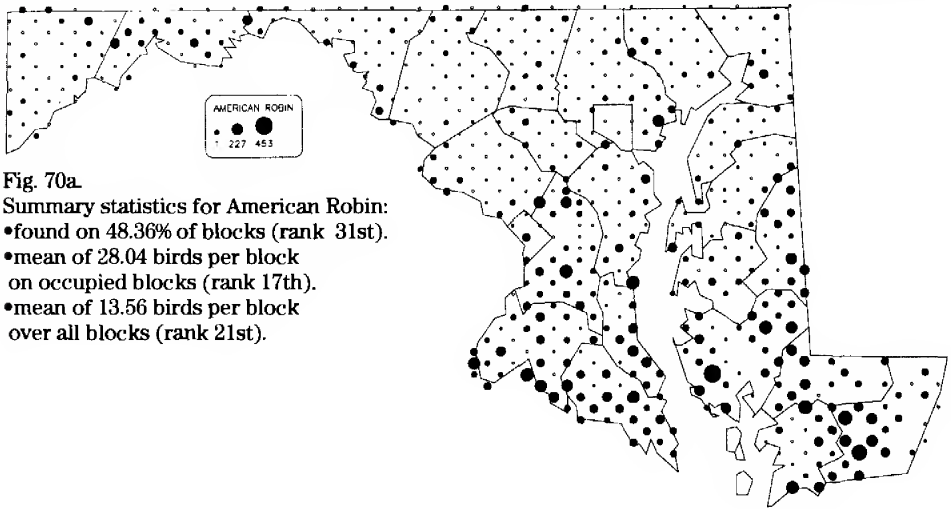


Fig. 70a.

Summary statistics for American Robin:

- found on 48.36% of blocks (rank 31st).
- mean of 28.04 birds per block on occupied blocks (rank 17th).
- mean of 13.56 birds per block over all blocks (rank 21st).

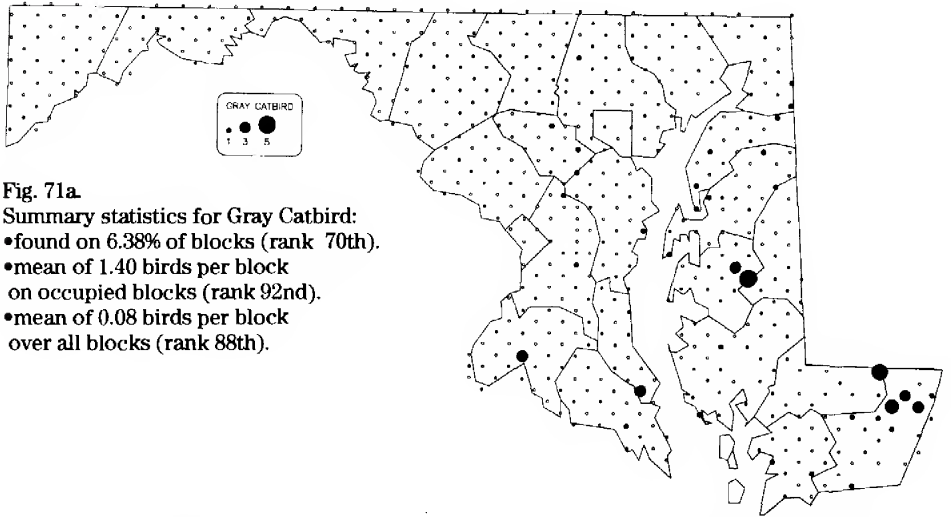


Fig. 71a.

Summary statistics for Gray Catbird:

- found on 6.38% of blocks (rank 70th).
- mean of 1.40 birds per block on occupied blocks (rank 92nd).
- mean of 0.08 birds per block over all blocks (rank 88th).

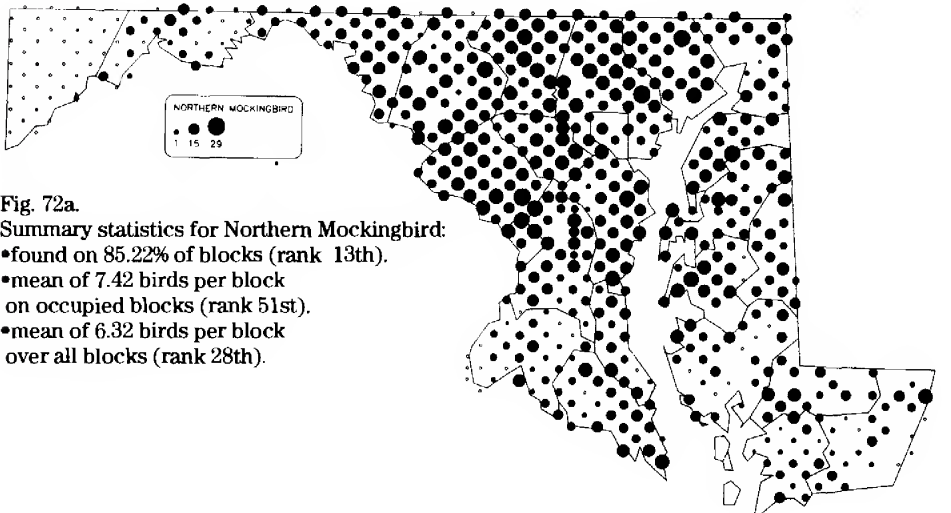


Fig. 72a.

Summary statistics for Northern Mockingbird:

- found on 85.22% of blocks (rank 13th).
- mean of 7.42 birds per block on occupied blocks (rank 51st).
- mean of 6.32 birds per block over all blocks (rank 28th).

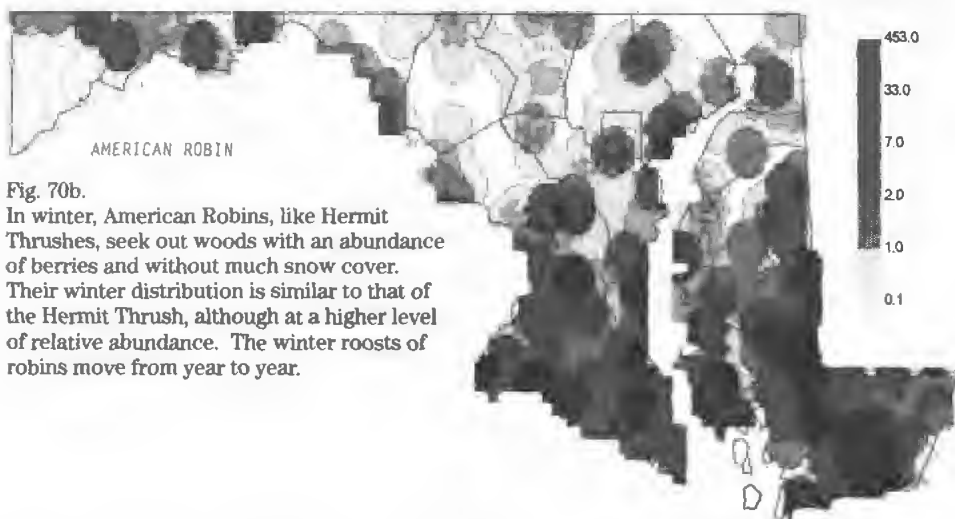


Fig. 70b.

In winter, American Robins, like Hermit Thrushes, seek out woods with an abundance of berries and without much snow cover. Their winter distribution is similar to that of the Hermit Thrush, although at a higher level of relative abundance. The winter roosts of robins move from year to year.

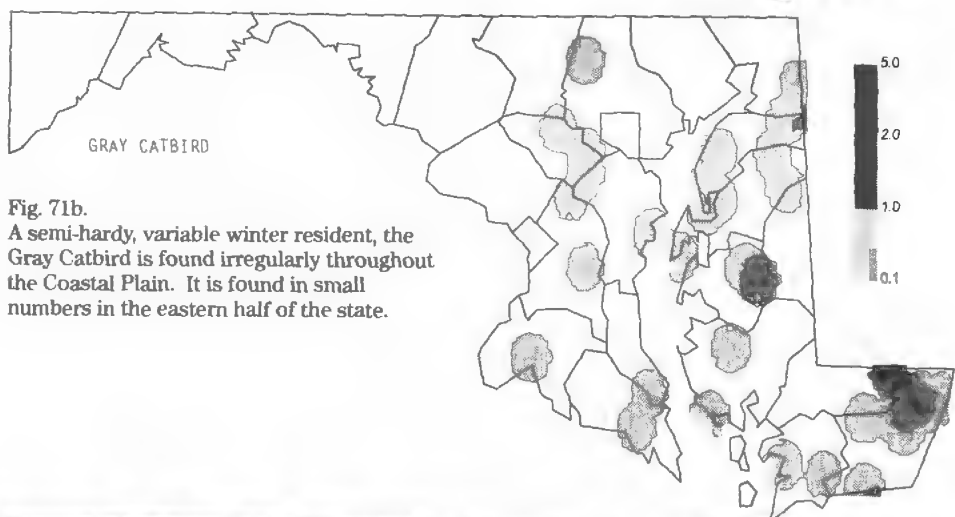


Fig. 71b.

A semi-hardy, variable winter resident, the Gray Catbird is found irregularly throughout the Coastal Plain. It is found in small numbers in the eastern half of the state.

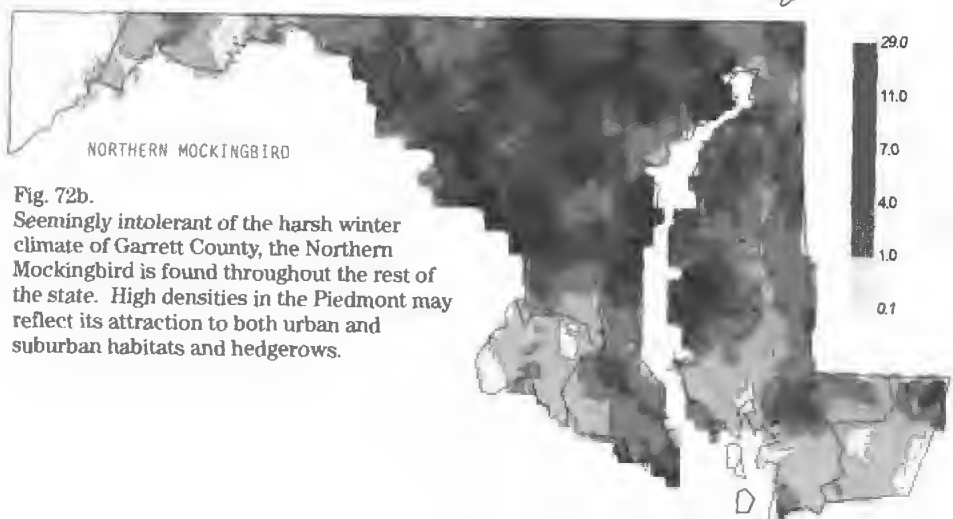


Fig. 72b.

Seemingly intolerant of the harsh winter climate of Garrett County, the Northern Mockingbird is found throughout the rest of the state. High densities in the Piedmont may reflect its attraction to both urban and suburban habitats and hedgerows.

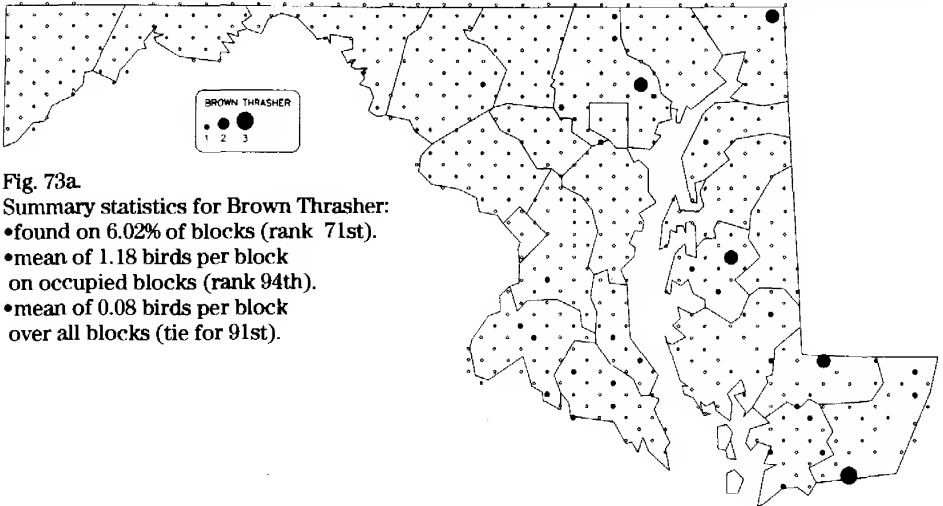


Fig. 73a.

Summary statistics for Brown Thrasher:

- found on 6.02% of blocks (rank 71st).
- mean of 1.18 birds per block on occupied blocks (rank 94th).
- mean of 0.08 birds per block over all blocks (tie for 91st).

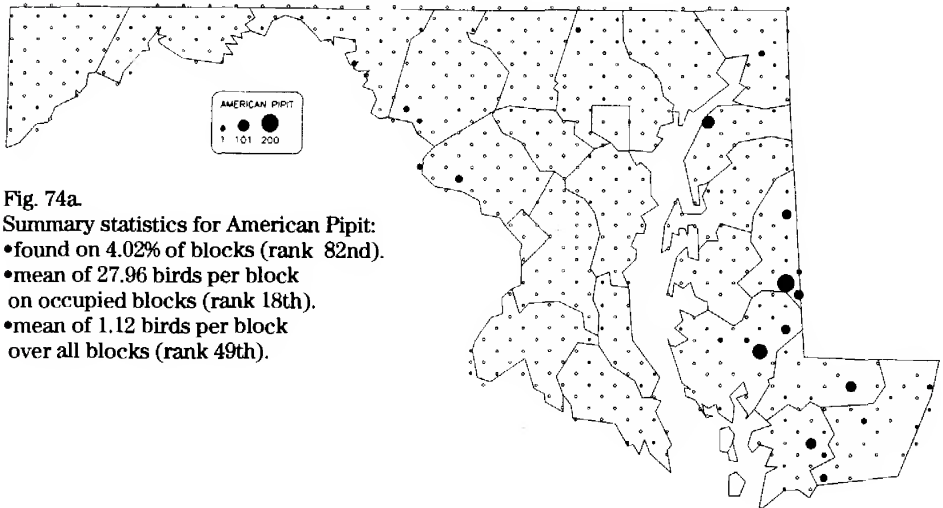


Fig. 74a.

Summary statistics for American Pipit:

- found on 4.02% of blocks (rank 82nd).
- mean of 27.96 birds per block on occupied blocks (rank 18th).
- mean of 1.12 birds per block over all blocks (rank 49th).

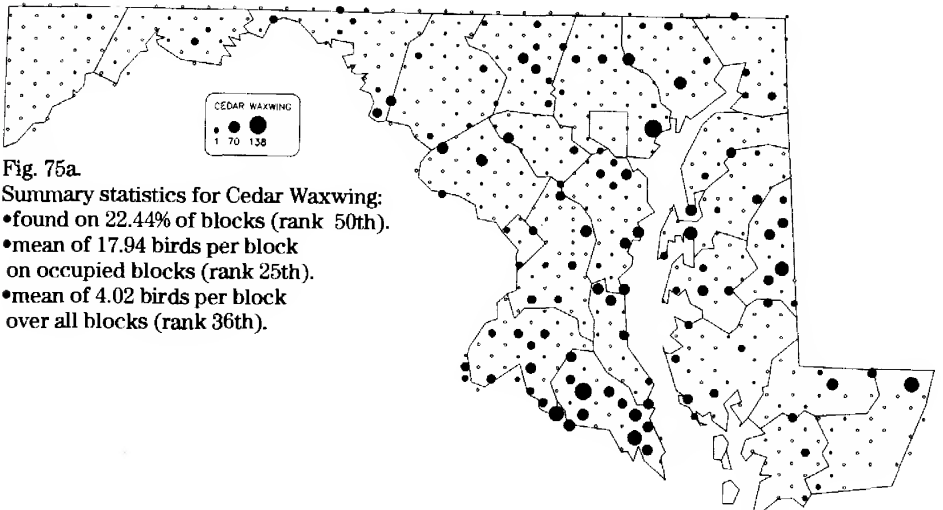


Fig. 75a.

Summary statistics for Cedar Waxwing:

- found on 22.44% of blocks (rank 50th).
- mean of 17.94 birds per block on occupied blocks (rank 25th).
- mean of 4.02 birds per block over all blocks (rank 36th).

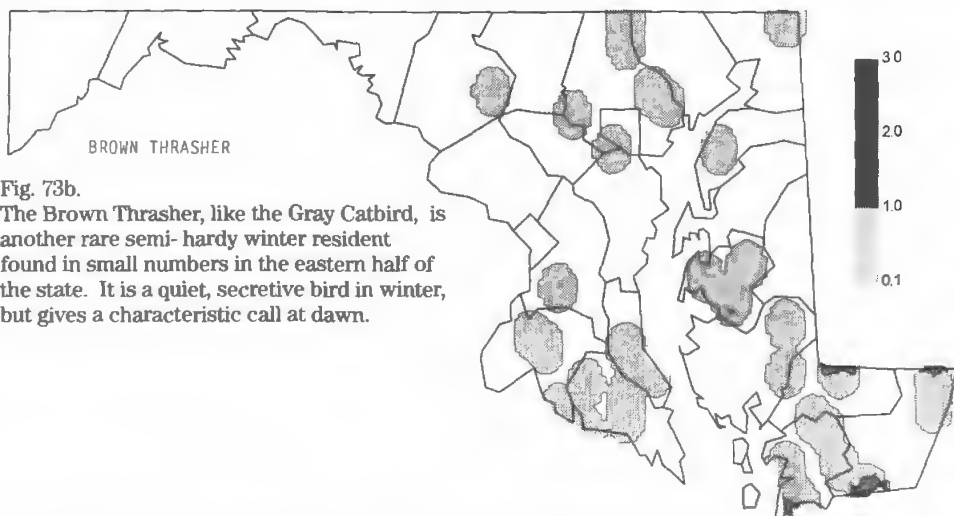


Fig. 73b.

The Brown Thrasher, like the Gray Catbird, is another rare semi-hardy winter resident found in small numbers in the eastern half of the state. It is a quiet, secretive bird in winter, but gives a characteristic call at dawn.

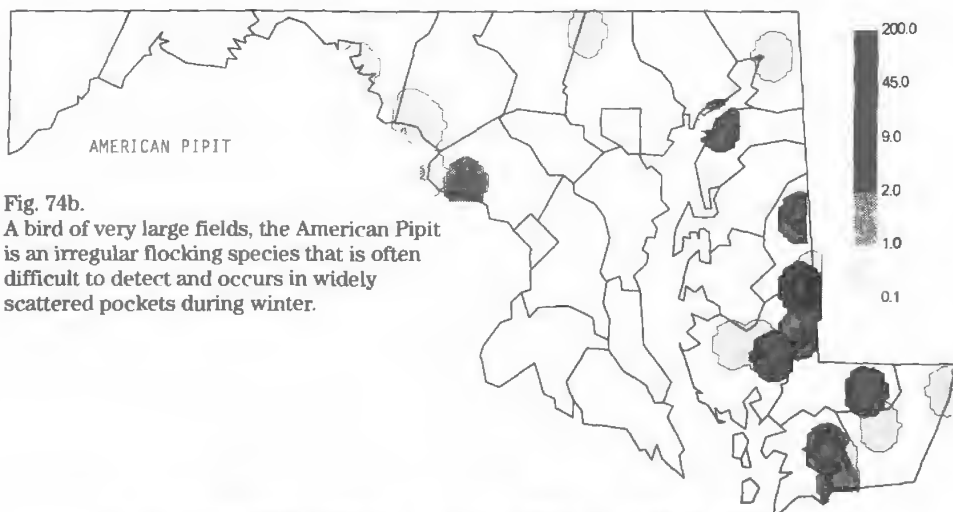


Fig. 74b.

A bird of very large fields, the American Pipit is an irregular flocking species that is often difficult to detect and occurs in widely scattered pockets during winter.

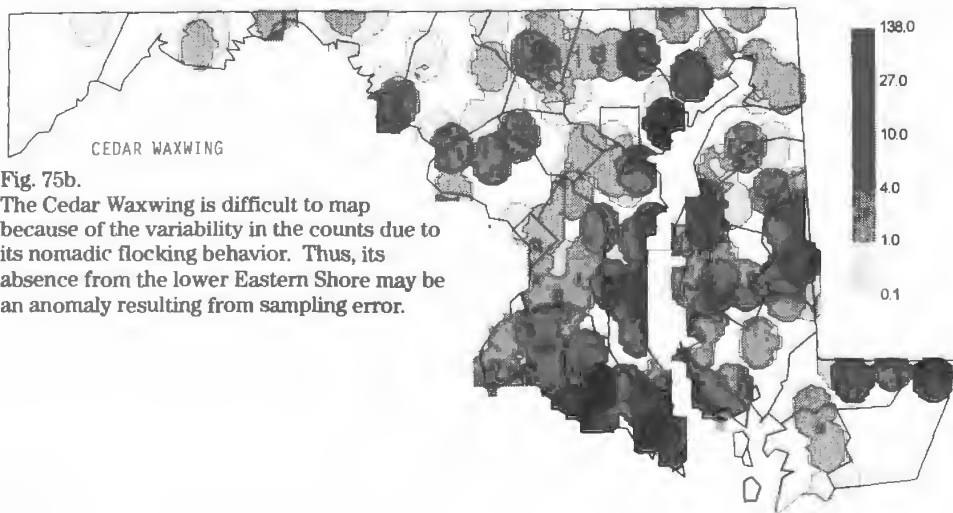


Fig. 75b.

The Cedar Waxwing is difficult to map because of the variability in the counts due to its nomadic flocking behavior. Thus, its absence from the lower Eastern Shore may be an anomaly resulting from sampling error.

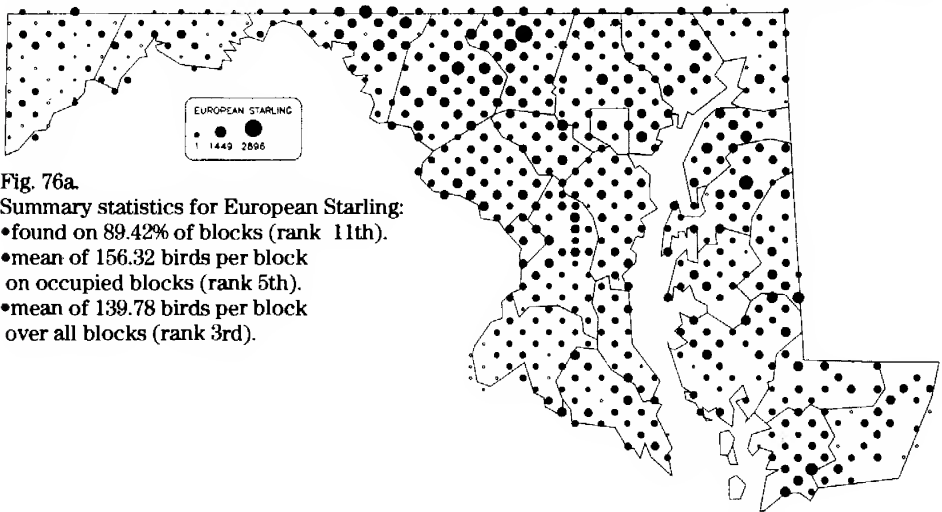


Fig. 76a.

Summary statistics for European Starling:

- found on 89.42% of blocks (rank 11th).
- mean of 156.32 birds per block on occupied blocks (rank 5th).
- mean of 139.78 birds per block over all blocks (rank 3rd).

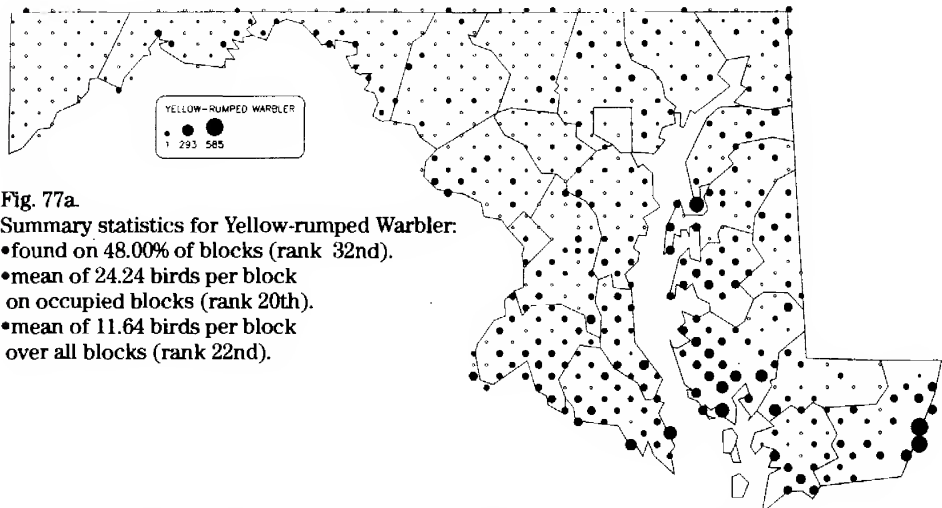


Fig. 77a.

Summary statistics for Yellow-rumped Warbler:

- found on 48.00% of blocks (rank 32nd).
- mean of 24.24 birds per block on occupied blocks (rank 20th).
- mean of 11.64 birds per block over all blocks (rank 22nd).

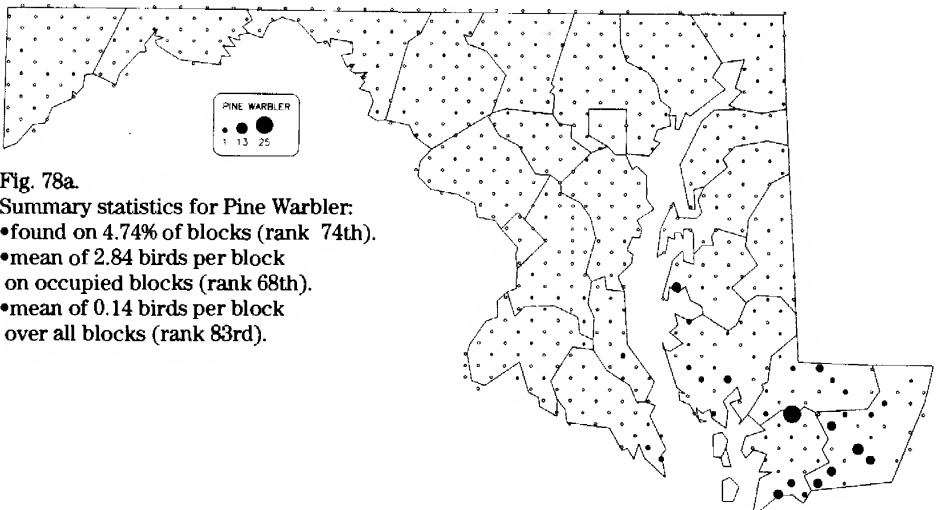


Fig. 78a.

Summary statistics for Pine Warbler:

- found on 4.74% of blocks (rank 74th).
- mean of 2.84 birds per block on occupied blocks (rank 68th).
- mean of 0.14 birds per block over all blocks (rank 83rd).

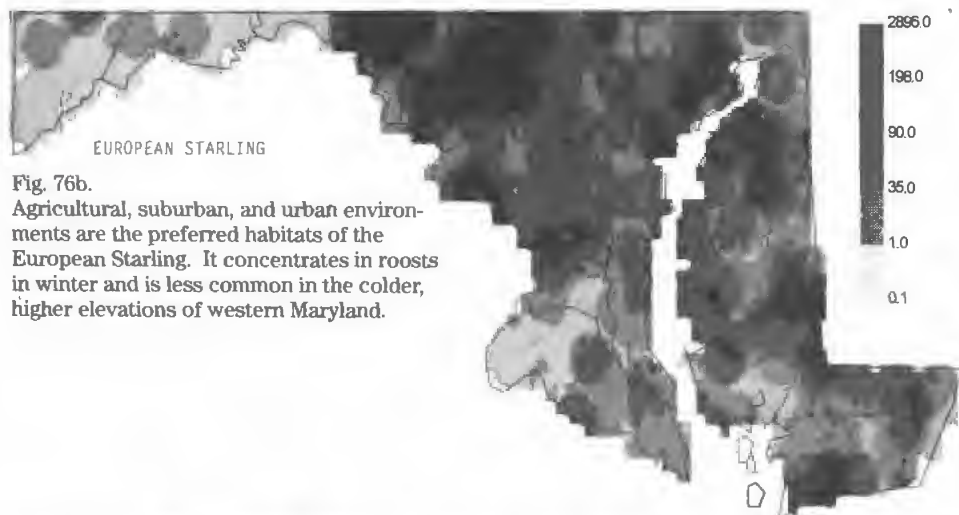


Fig. 76b.

Agricultural, suburban, and urban environments are the preferred habitats of the European Starling. It concentrates in roosts in winter and is less common in the colder, higher elevations of western Maryland.

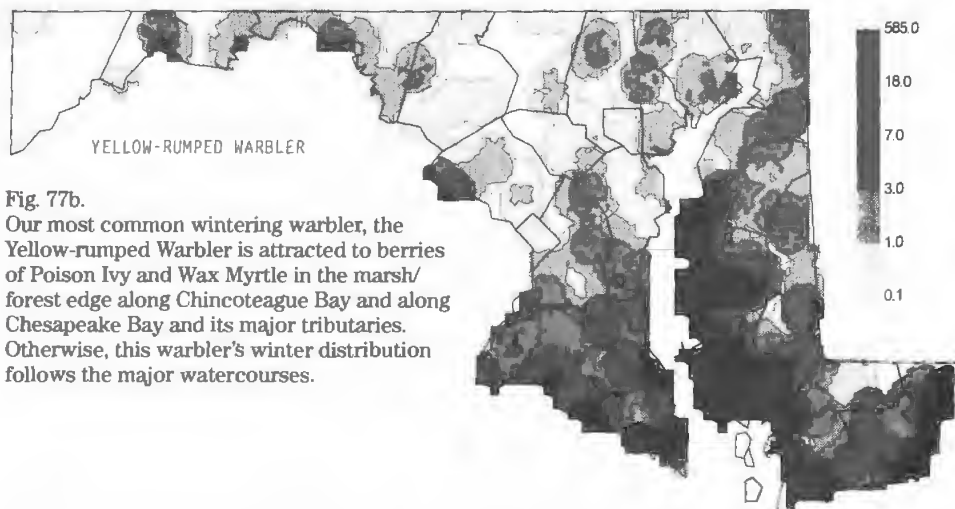


Fig. 77b.

Our most common wintering warbler, the Yellow-rumped Warbler is attracted to berries of Poison Ivy and Wax Myrtle in the marsh/forest edge along Chincoteague Bay and along Chesapeake Bay and its major tributaries. Otherwise, this warbler's winter distribution follows the major watercourses.

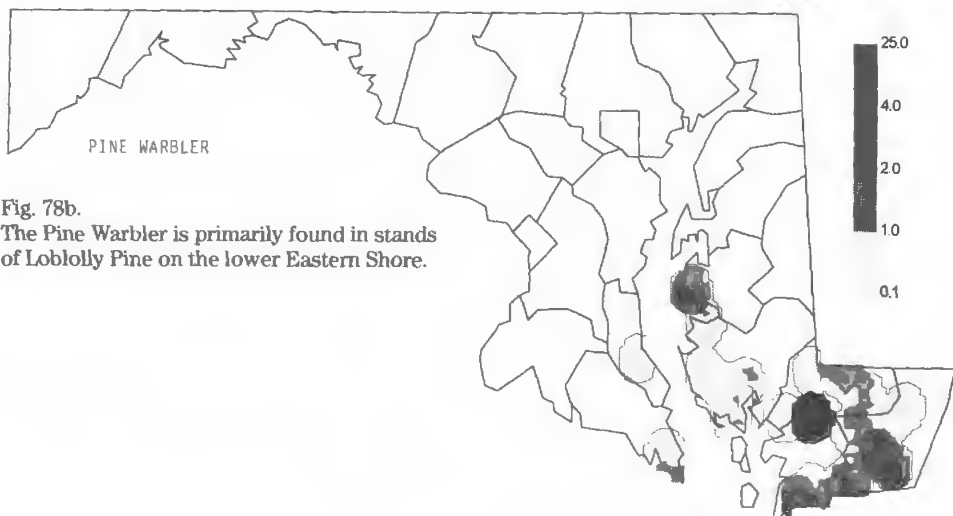


Fig. 78b.

The Pine Warbler is primarily found in stands of Loblolly Pine on the lower Eastern Shore.

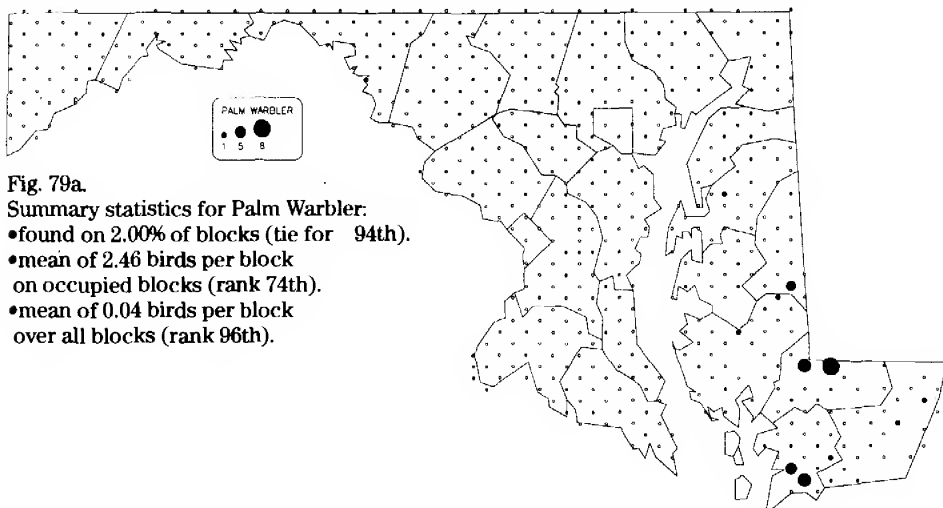


Fig. 79a.

Summary statistics for Palm Warbler:

- found on 2.00% of blocks (tie for 94th).
- mean of 2.46 birds per block on occupied blocks (rank 74th).
- mean of 0.04 birds per block over all blocks (rank 96th).

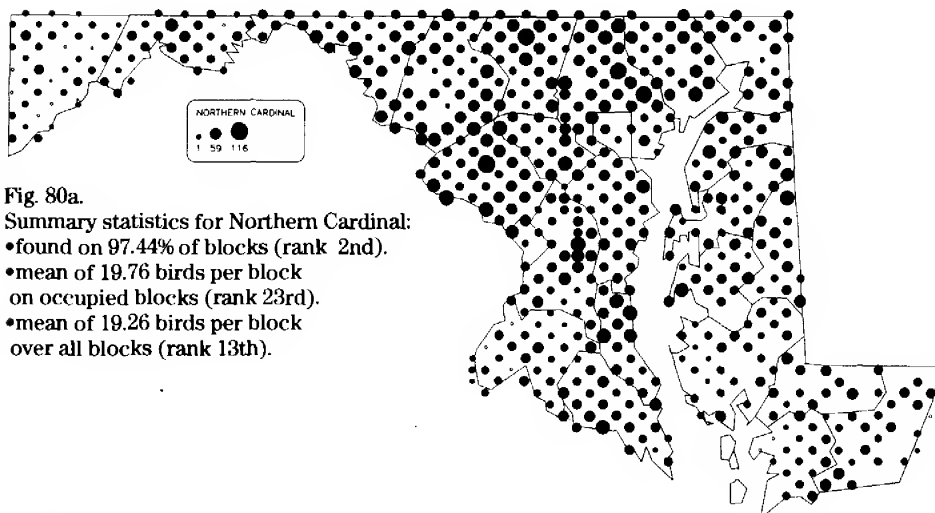


Fig. 80a.

Summary statistics for Northern Cardinal:

- found on 97.44% of blocks (rank 2nd).
- mean of 19.76 birds per block on occupied blocks (rank 23rd).
- mean of 19.26 birds per block over all blocks (rank 13th).

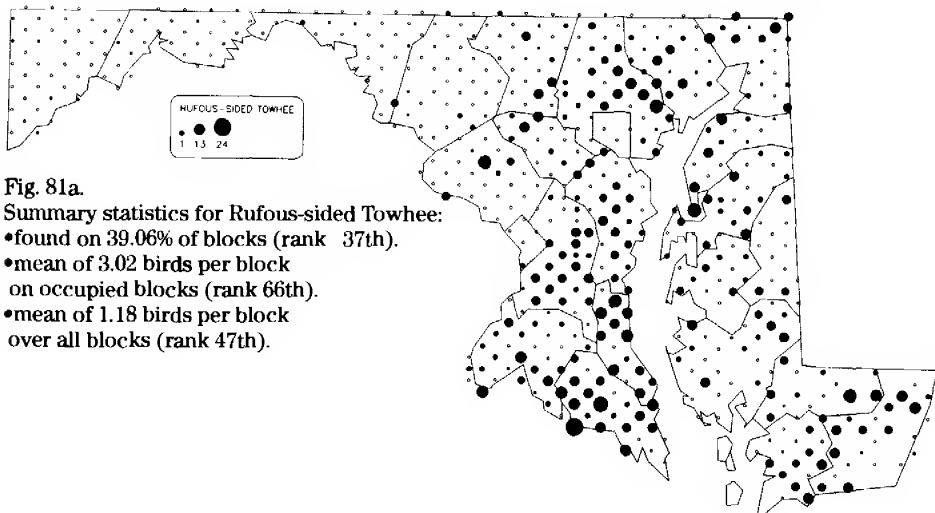


Fig. 81a.

Summary statistics for Rufous-sided Towhee:

- found on 39.06% of blocks (rank 37th).
- mean of 3.02 birds per block on occupied blocks (rank 66th).
- mean of 1.18 birds per block over all blocks (rank 47th).

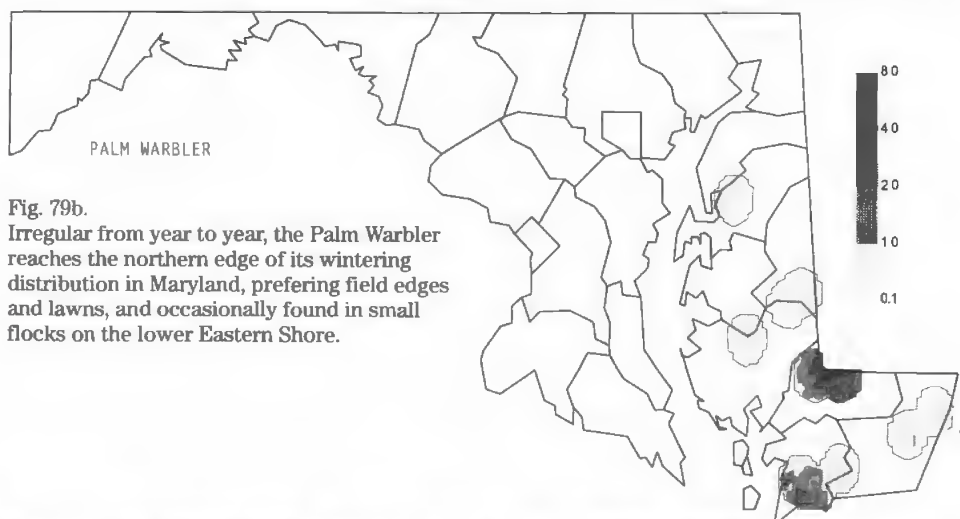


Fig. 79b.

Irregular from year to year, the Palm Warbler reaches the northern edge of its wintering distribution in Maryland, preferring field edges and lawns, and occasionally found in small flocks on the lower Eastern Shore.

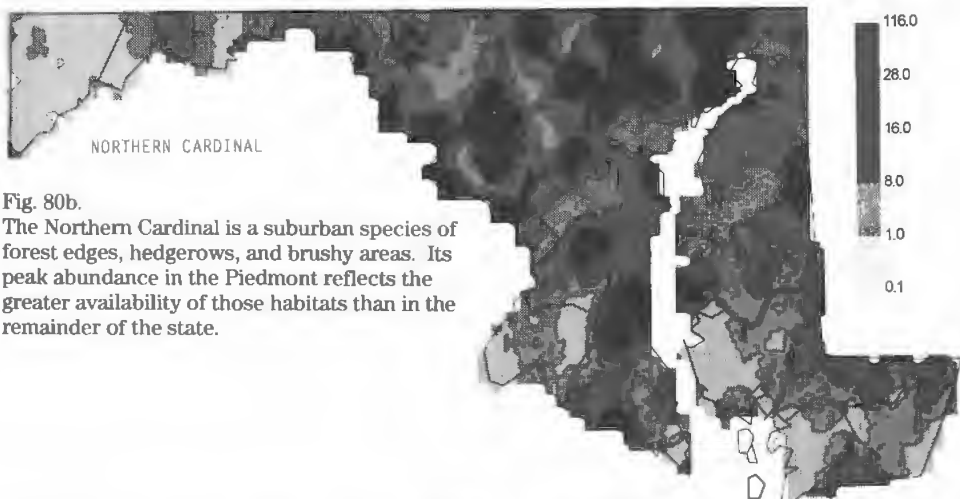


Fig. 80b.

The Northern Cardinal is a suburban species of forest edges, hedgerows, and brushy areas. Its peak abundance in the Piedmont reflects the greater availability of those habitats than in the remainder of the state.

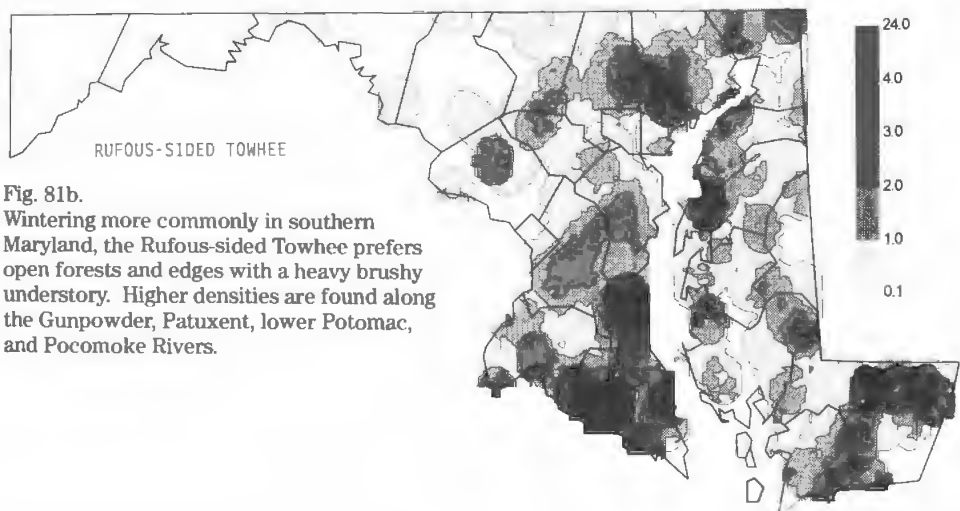


Fig. 81b.

Wintering more commonly in southern Maryland, the Rufous-sided Towhee prefers open forests and edges with a heavy brushy understory. Higher densities are found along the Gunpowder, Patuxent, lower Potomac, and Pocomoke Rivers.

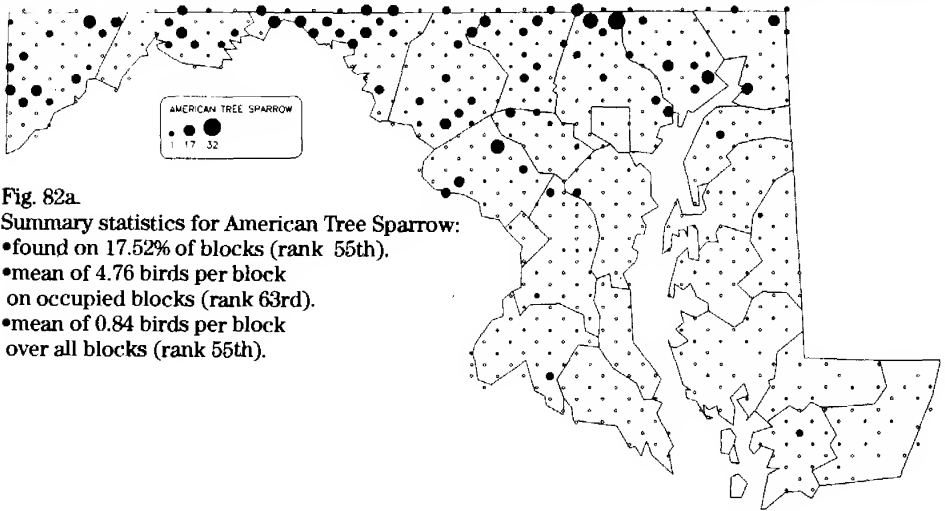


Fig. 82a.

Summary statistics for American Tree Sparrow:

- found on 17.52% of blocks (rank 55th).
- mean of 4.76 birds per block on occupied blocks (rank 63rd).
- mean of 0.84 birds per block over all blocks (rank 55th).

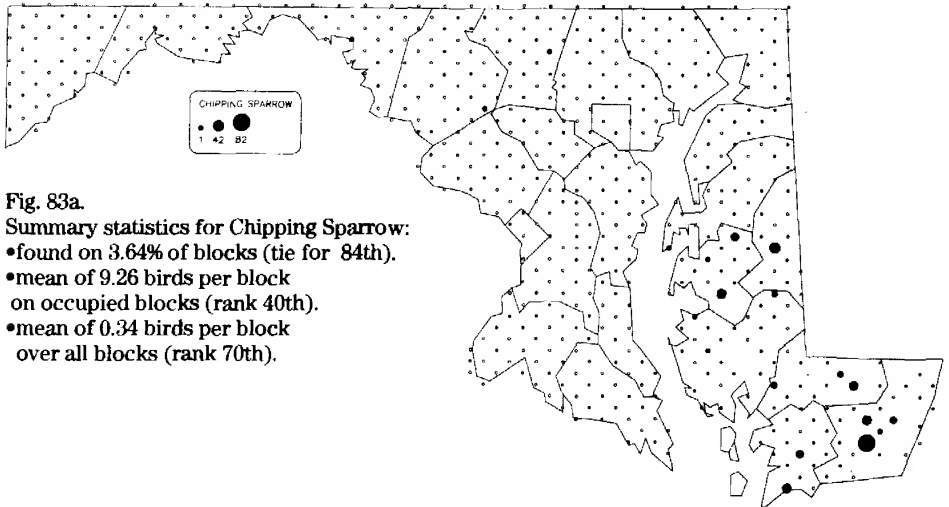


Fig. 83a.

Summary statistics for Chipping Sparrow:

- found on 3.64% of blocks (tie for 84th).
- mean of 9.26 birds per block on occupied blocks (rank 40th).
- mean of 0.34 birds per block over all blocks (rank 70th).

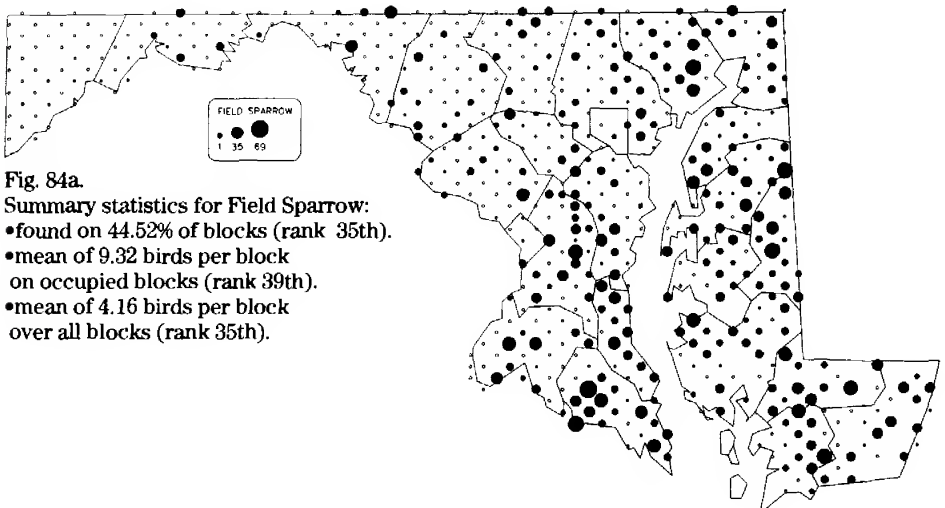


Fig. 84a.

Summary statistics for Field Sparrow:

- found on 44.52% of blocks (rank 35th).
- mean of 9.32 birds per block on occupied blocks (rank 39th).
- mean of 4.16 birds per block over all blocks (rank 35th).

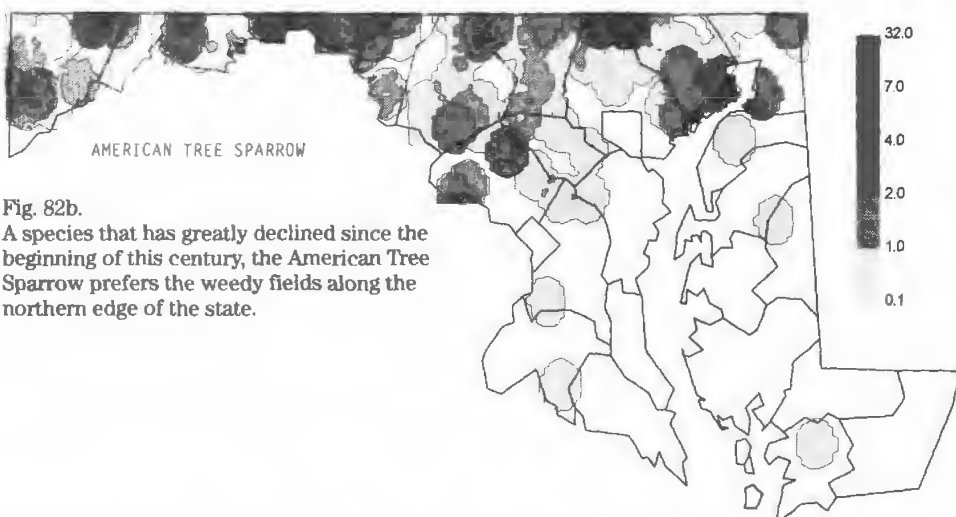


Fig. 82b.

A species that has greatly declined since the beginning of this century, the American Tree Sparrow prefers the weedy fields along the northern edge of the state.

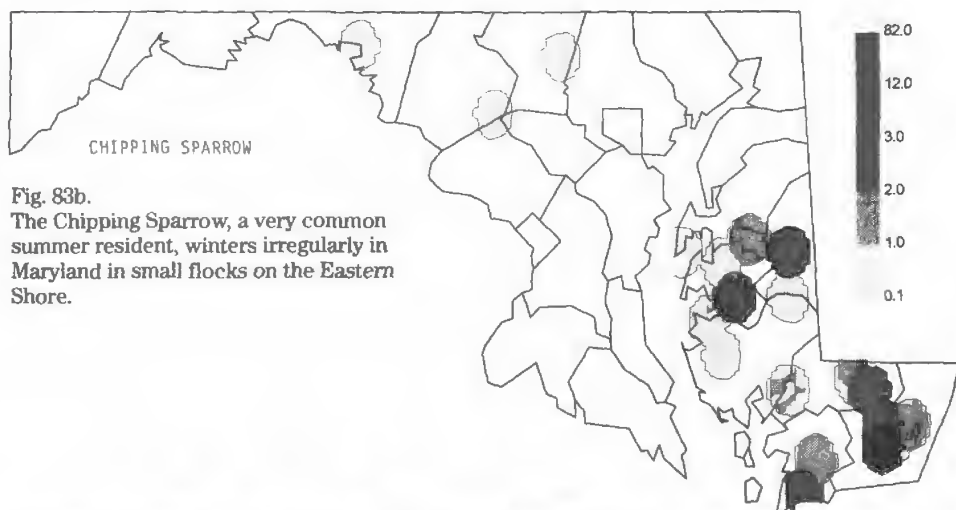


Fig. 83b.

The Chipping Sparrow, a very common summer resident, winters irregularly in Maryland in small flocks on the Eastern Shore.

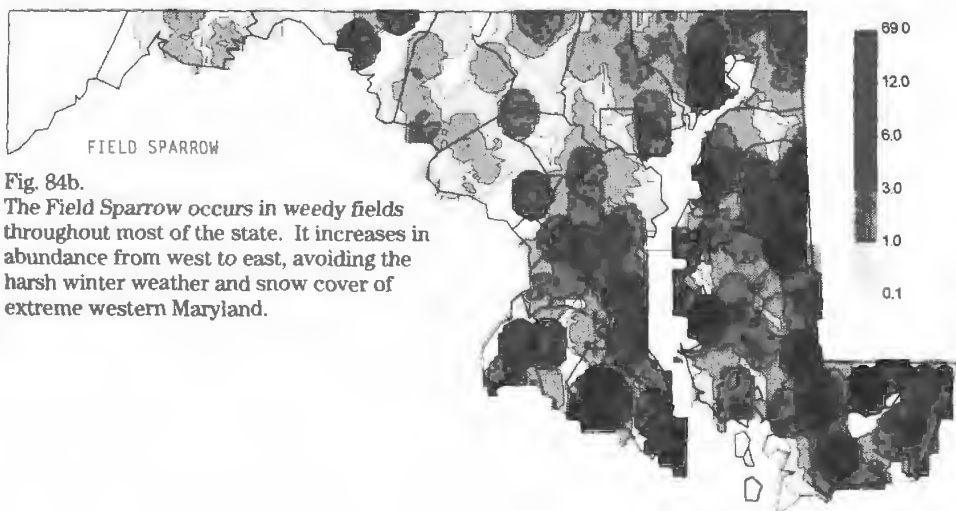


Fig. 84b.

The Field Sparrow occurs in weedy fields throughout most of the state. It increases in abundance from west to east, avoiding the harsh winter weather and snow cover of extreme western Maryland.

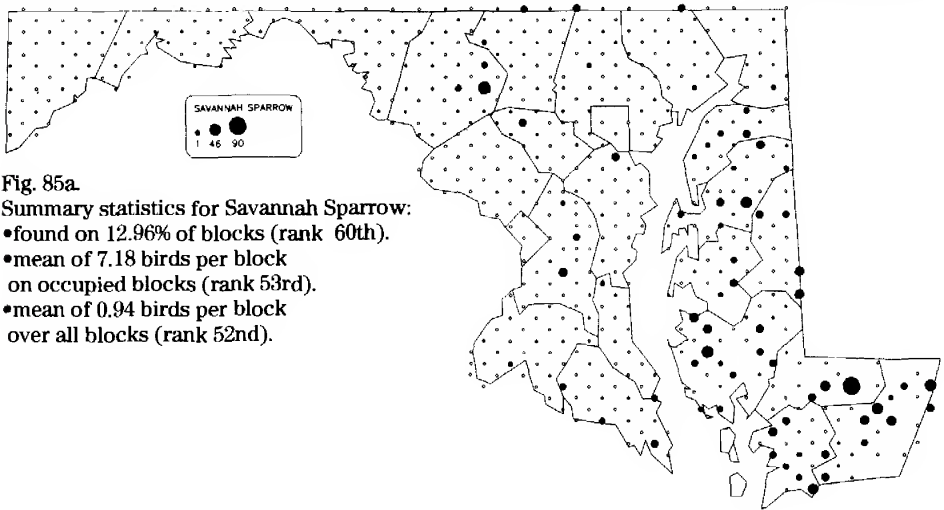


Fig. 85a.

Summary statistics for Savannah Sparrow:

- found on 12.96% of blocks (rank 60th).
- mean of 7.18 birds per block on occupied blocks (rank 53rd).
- mean of 0.94 birds per block over all blocks (rank 52nd).

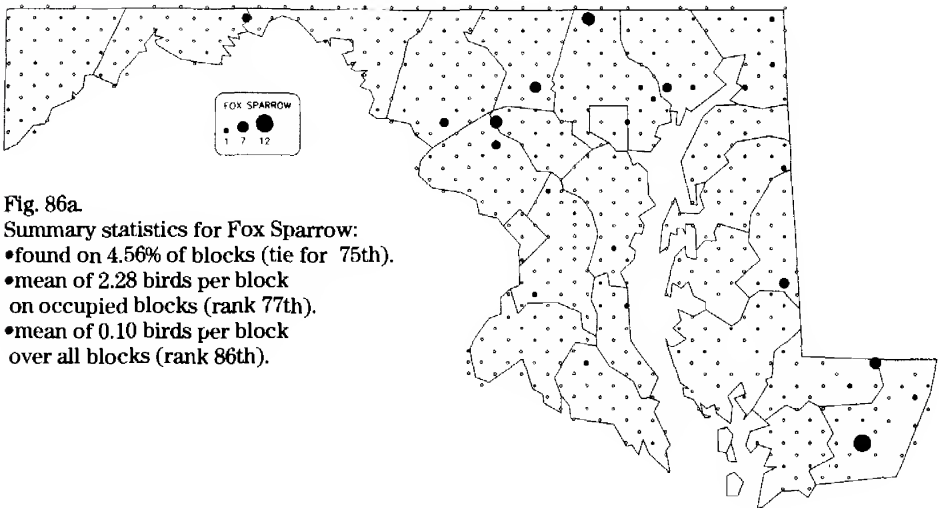


Fig. 86a.

Summary statistics for Fox Sparrow:

- found on 4.56% of blocks (tie for 75th).
- mean of 2.28 birds per block on occupied blocks (rank 77th).
- mean of 0.10 birds per block over all blocks (rank 86th).

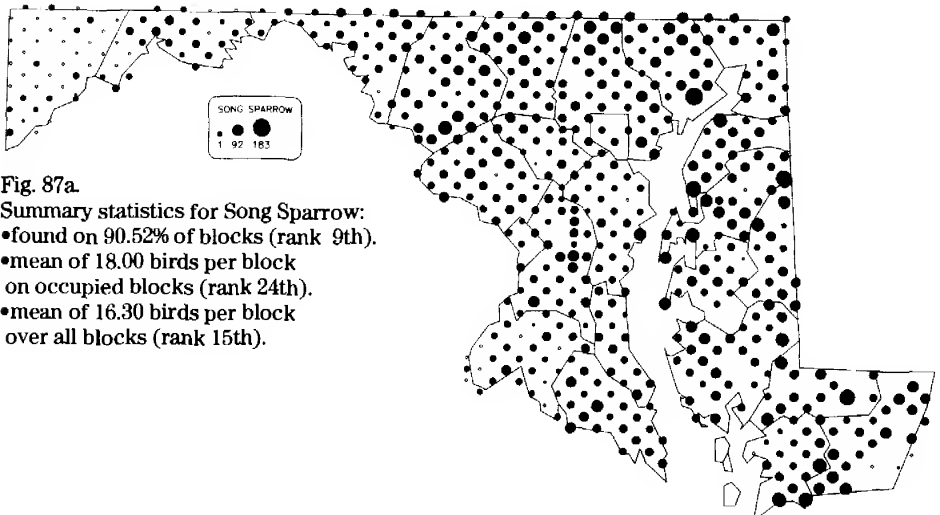


Fig. 87a.

Summary statistics for Song Sparrow:

- found on 90.52% of blocks (rank 9th).
- mean of 18.00 birds per block on occupied blocks (rank 24th).
- mean of 16.30 birds per block over all blocks (rank 15th).

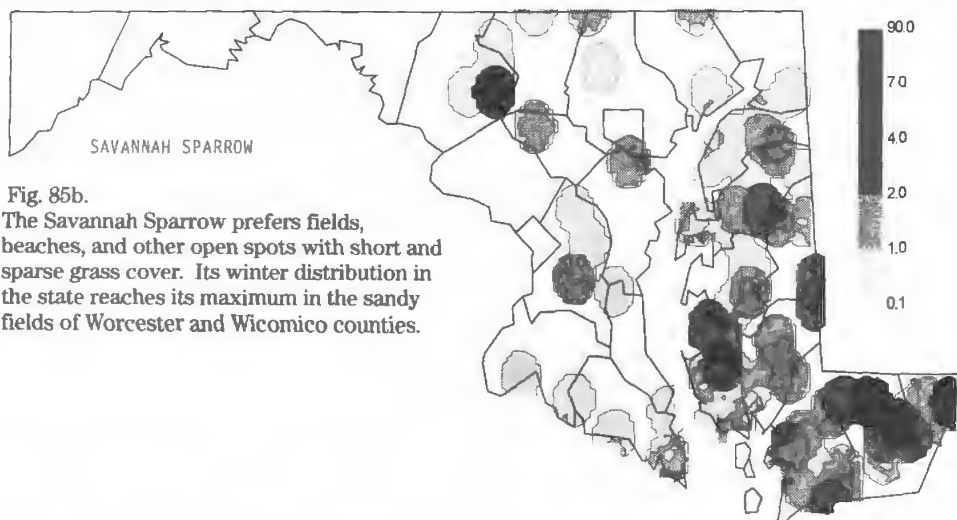


Fig. 85b.

The Savannah Sparrow prefers fields, beaches, and other open spots with short and sparse grass cover. Its winter distribution in the state reaches its maximum in the sandy fields of Worcester and Wicomico counties.

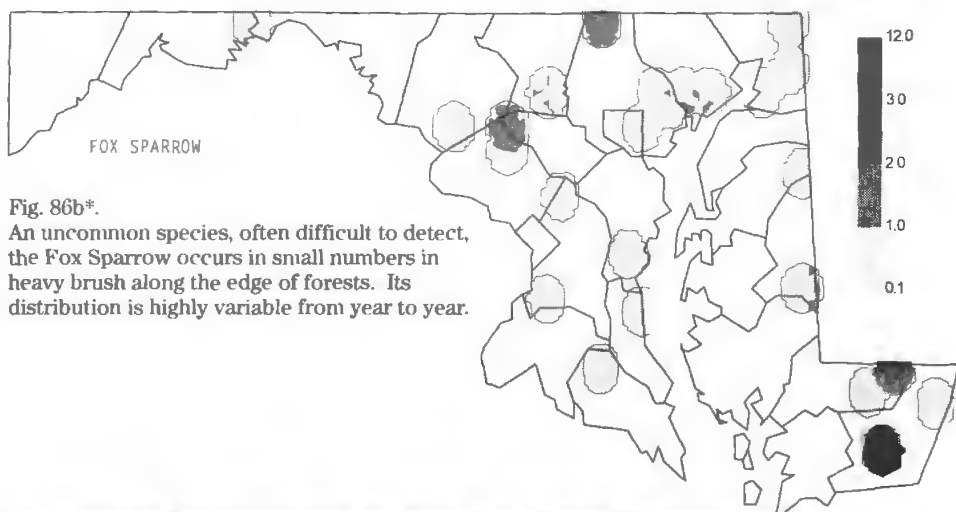


Fig. 86b*.

An uncommon species, often difficult to detect, the Fox Sparrow occurs in small numbers in heavy brush along the edge of forests. Its distribution is highly variable from year to year.

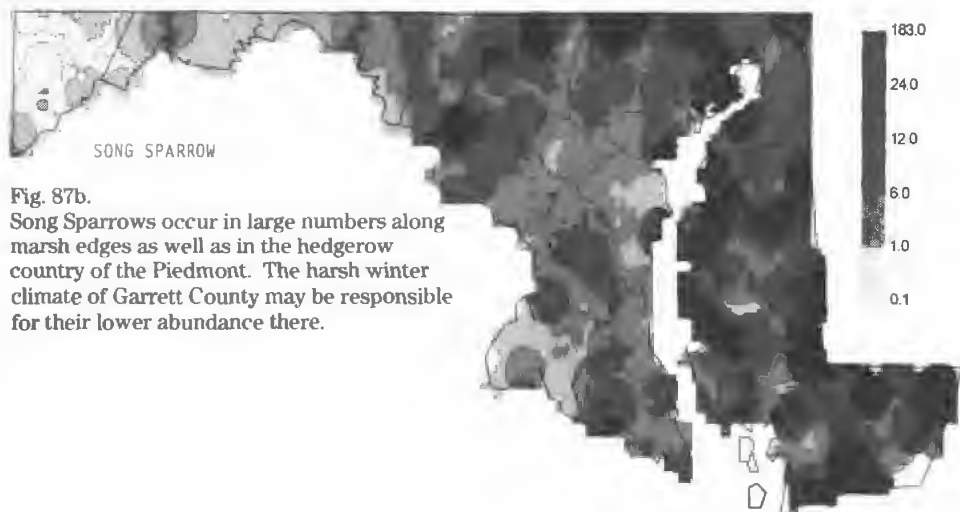


Fig. 87b.

Song Sparrows occur in large numbers along marsh edges as well as in the hedgerow country of the Piedmont. The harsh winter climate of Garrett County may be responsible for their lower abundance there.

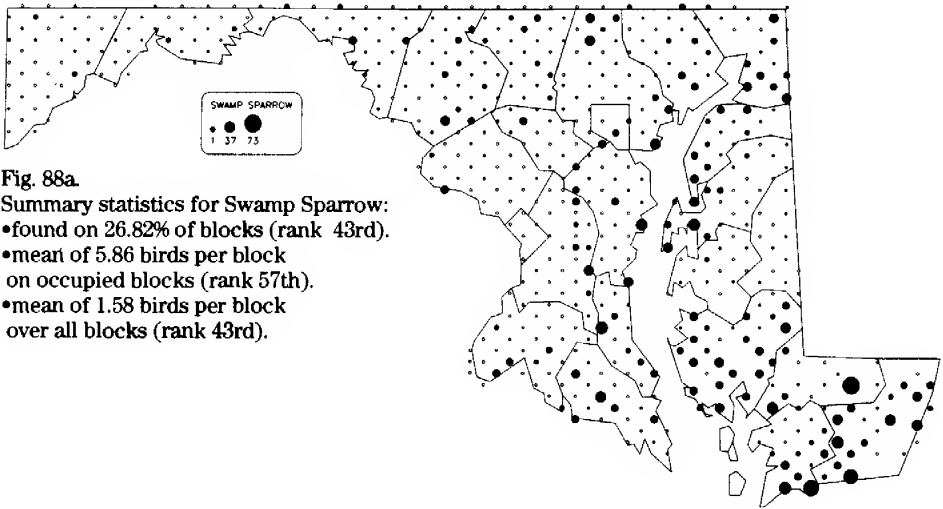


Fig. 88a.

Summary statistics for Swamp Sparrow:

- found on 26.82% of blocks (rank 43rd).
- mean of 5.86 birds per block on occupied blocks (rank 57th).
- mean of 1.58 birds per block over all blocks (rank 43rd).

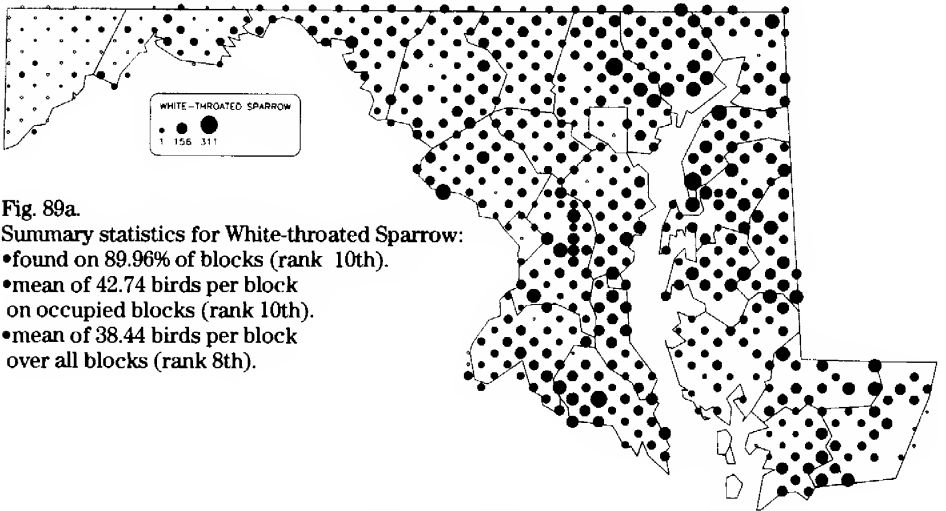


Fig. 89a.

Summary statistics for White-throated Sparrow:

- found on 89.96% of blocks (rank 10th).
- mean of 42.74 birds per block on occupied blocks (rank 10th).
- mean of 38.44 birds per block over all blocks (rank 8th).

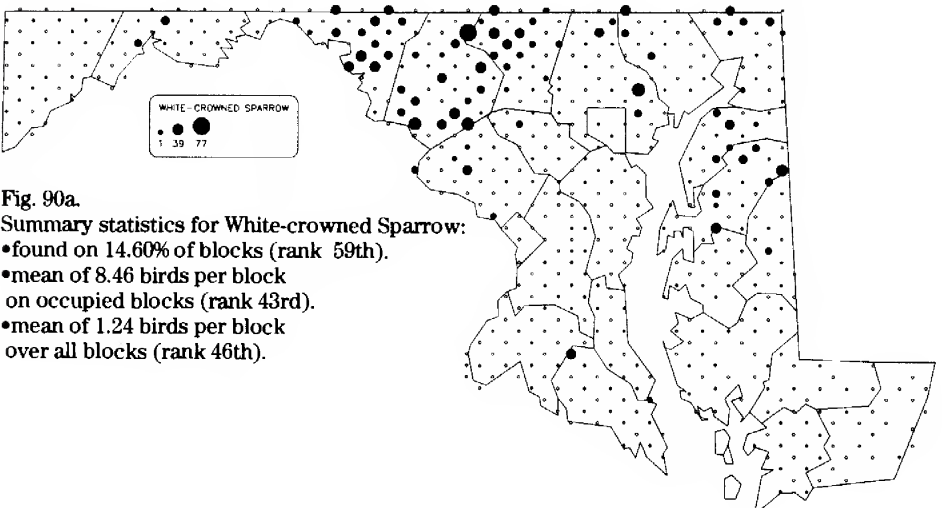


Fig. 90a.

Summary statistics for White-crowned Sparrow:

- found on 14.60% of blocks (rank 59th).
- mean of 8.46 birds per block on occupied blocks (rank 43rd).
- mean of 1.24 birds per block over all blocks (rank 46th).

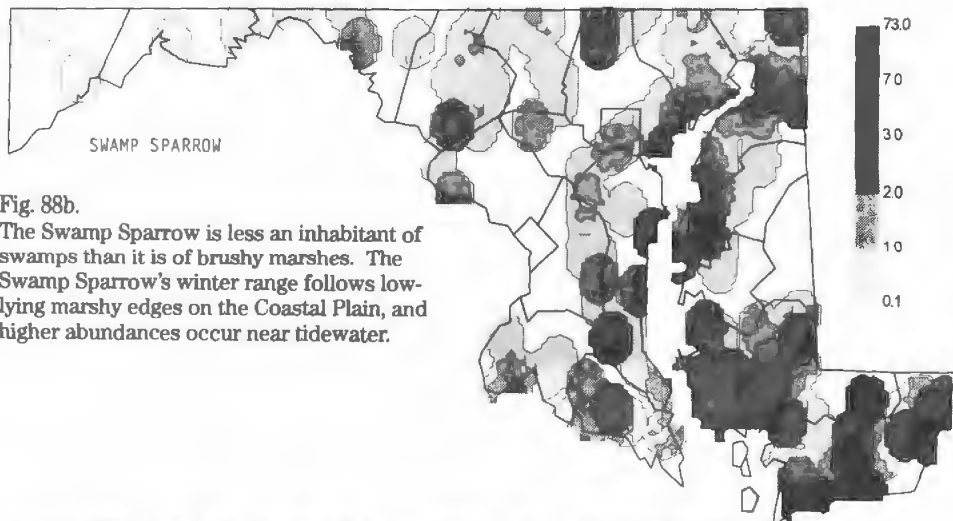


Fig. 88b.

The Swamp Sparrow is less an inhabitant of swamps than it is of brushy marshes. The Swamp Sparrow's winter range follows low-lying marshy edges on the Coastal Plain, and higher abundances occur near tidewater.



Fig. 89b.

The White-throated Sparrow is a flocking species of brushy borders and edges of upland and lowland forests and fields. In winter, its abundance increases eastward.

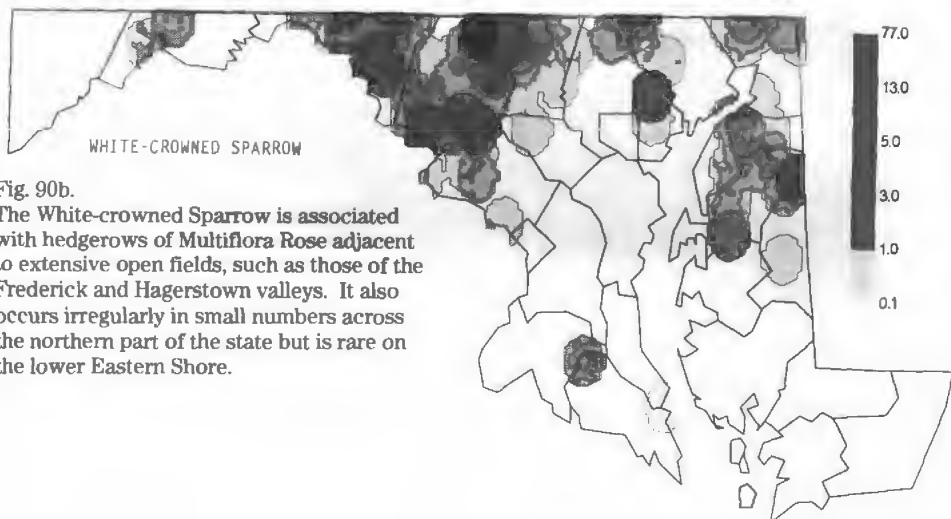


Fig. 90b.

The White-crowned Sparrow is associated with hedgerows of *Multiflora Rose* adjacent to extensive open fields, such as those of the Frederick and Hagerstown valleys. It also occurs irregularly in small numbers across the northern part of the state but is rare on the lower Eastern Shore.

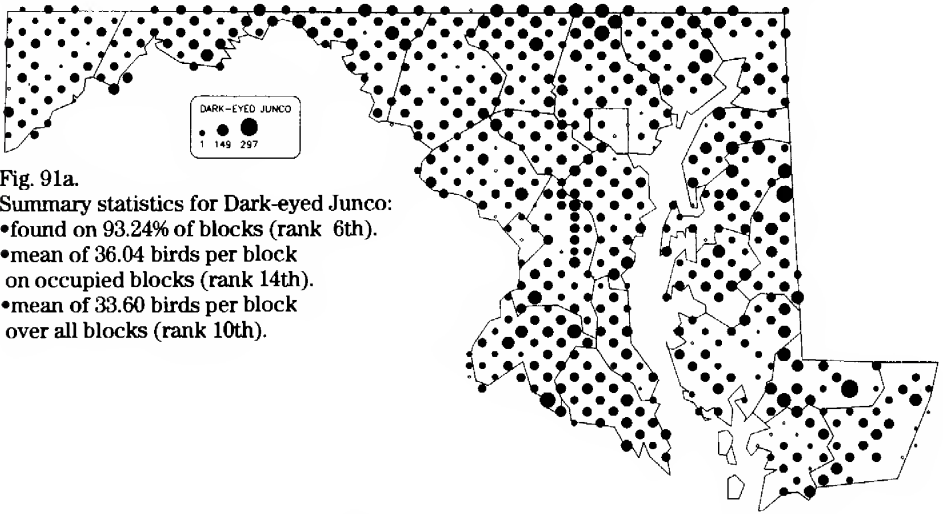


Fig. 91a.

Summary statistics for Dark-eyed Junco:

- found on 93.24% of blocks (rank 6th).
- mean of 36.04 birds per block on occupied blocks (rank 14th).
- mean of 33.60 birds per block over all blocks (rank 10th).

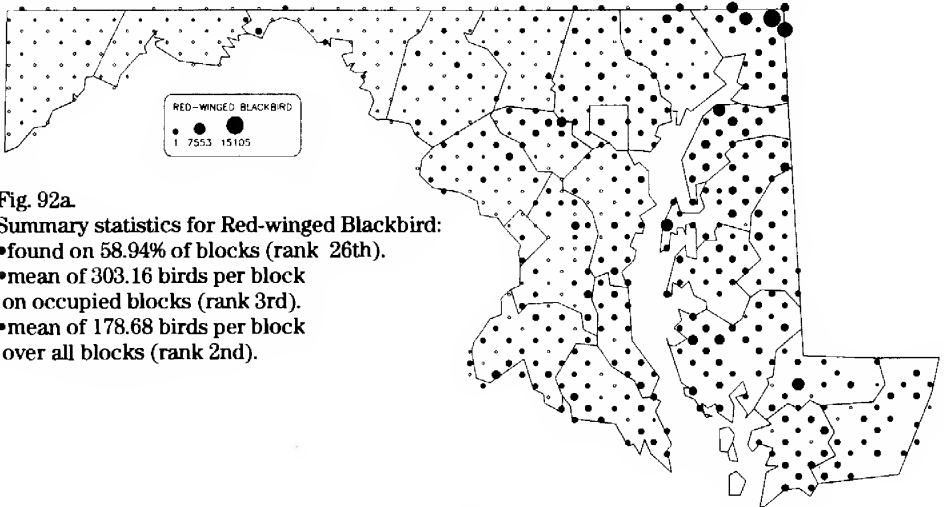


Fig. 92a.

Summary statistics for Red-winged Blackbird:

- found on 58.94% of blocks (rank 26th).
- mean of 303.16 birds per block on occupied blocks (rank 3rd).
- mean of 178.68 birds per block over all blocks (rank 2nd).

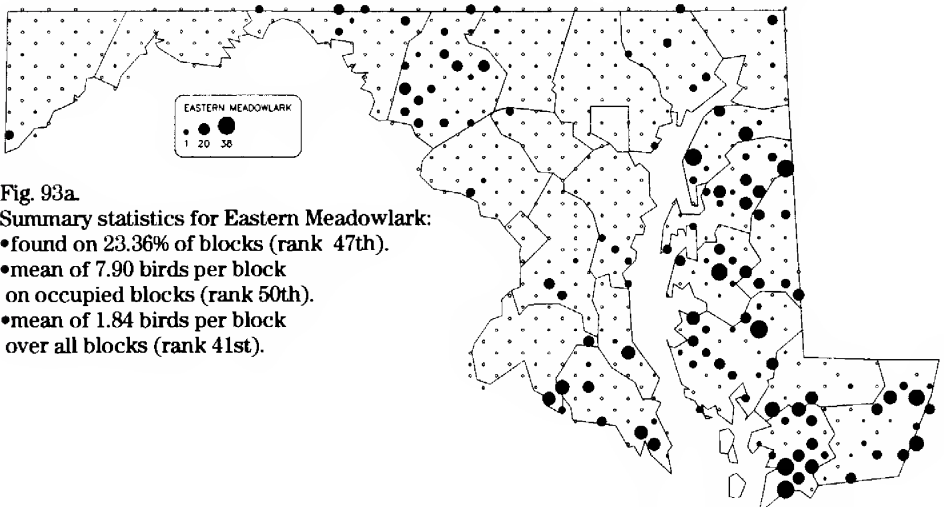


Fig. 93a.

Summary statistics for Eastern Meadowlark:

- found on 23.36% of blocks (rank 47th).
- mean of 7.90 birds per block on occupied blocks (rank 50th).
- mean of 1.84 birds per block over all blocks (rank 41st).

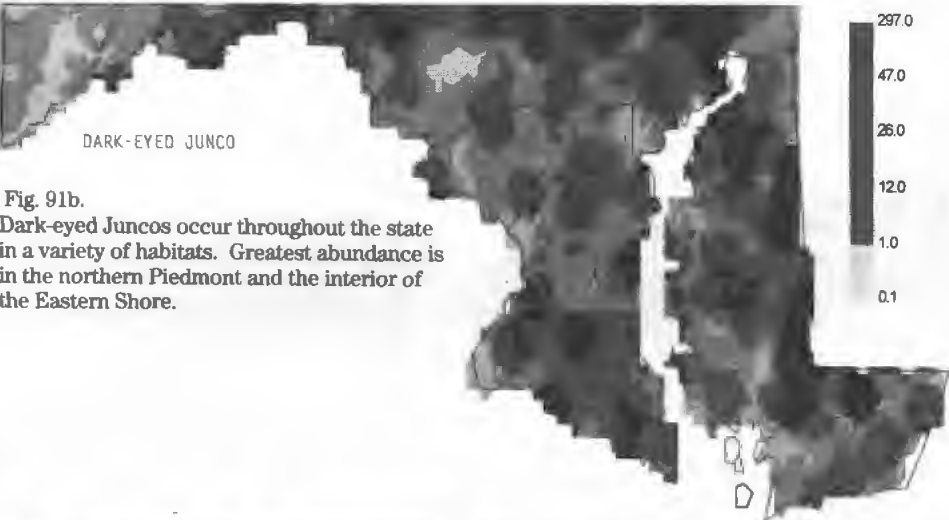


Fig. 91b.
Dark-eyed Juncos occur throughout the state in a variety of habitats. Greatest abundance is in the northern Piedmont and the interior of the Eastern Shore.

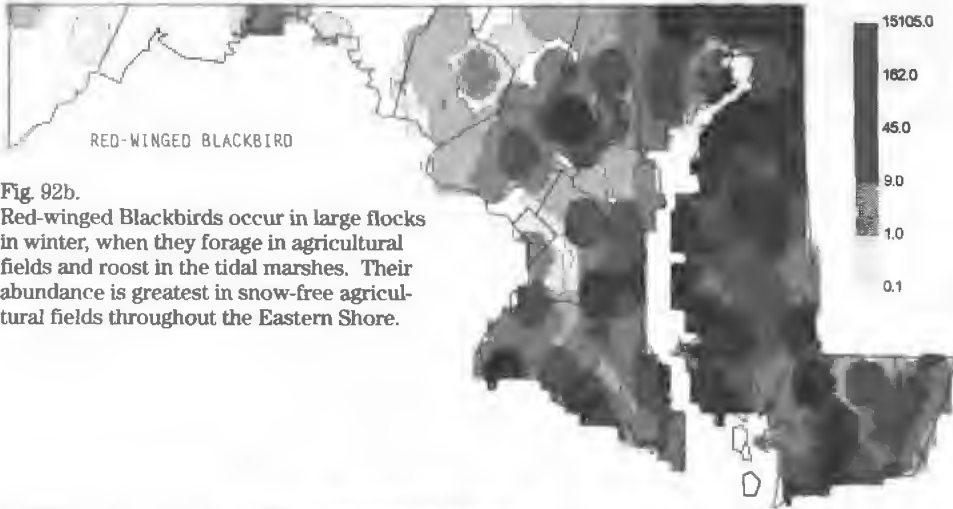


Fig. 92b.
Red-winged Blackbirds occur in large flocks in winter, when they forage in agricultural fields and roost in the tidal marshes. Their abundance is greatest in snow-free agricultural fields throughout the Eastern Shore.

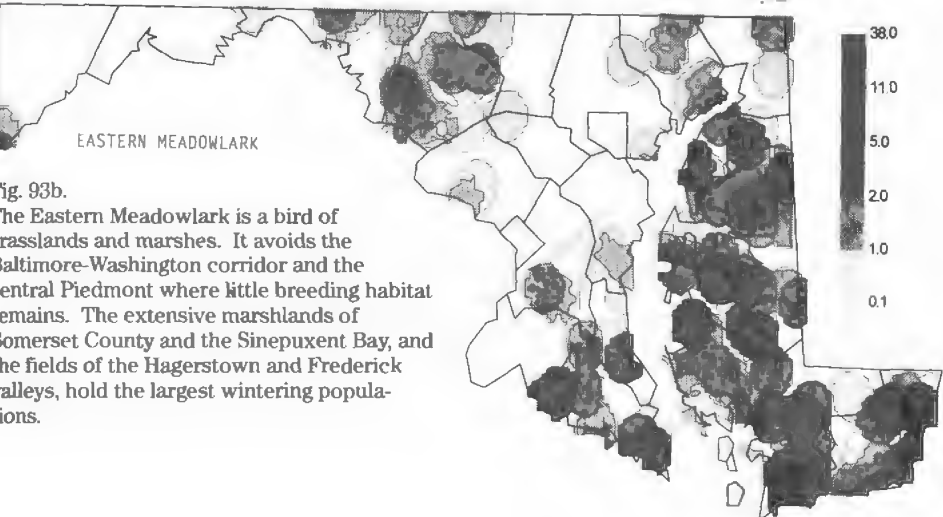


Fig. 93b.
The Eastern Meadowlark is a bird of grasslands and marshes. It avoids the Baltimore-Washington corridor and the central Piedmont where little breeding habitat remains. The extensive marshlands of Somerset County and the Sinepuxent Bay, and the fields of the Hagerstown and Frederick valleys, hold the largest wintering populations.

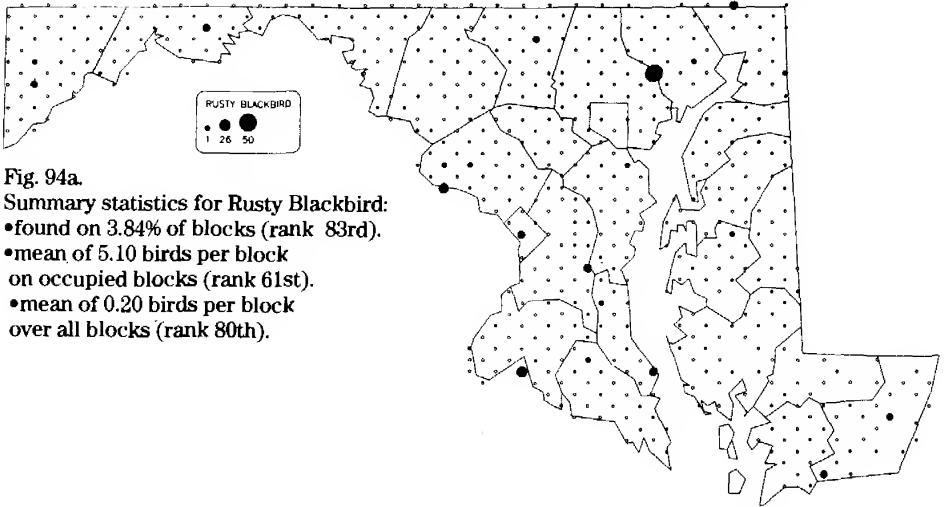


Fig. 94a.

Summary statistics for Rusty Blackbird:

- found on 3.84% of blocks (rank 83rd).
- mean of 5.10 birds per block on occupied blocks (rank 61st).
- mean of 0.20 birds per block over all blocks (rank 80th).

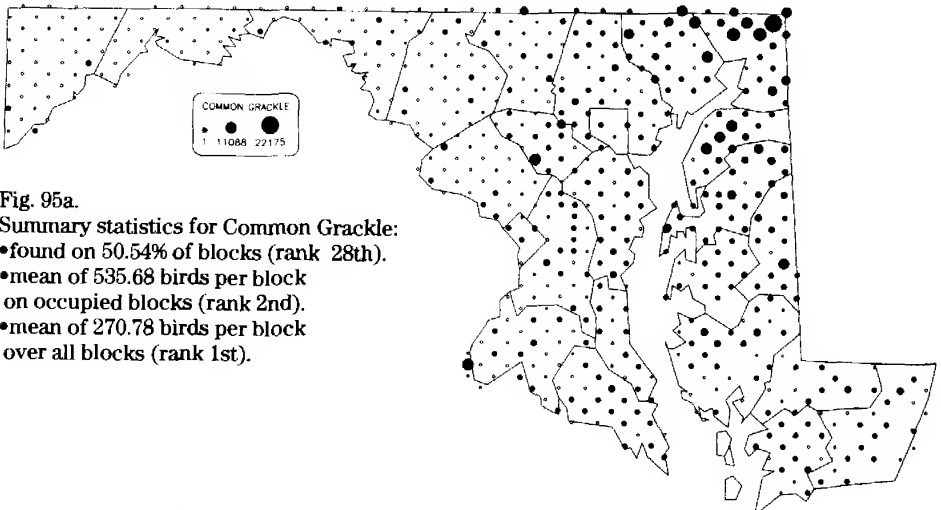


Fig. 95a.

Summary statistics for Common Grackle:

- found on 50.54% of blocks (rank 28th).
- mean of 535.68 birds per block on occupied blocks (rank 2nd).
- mean of 270.78 birds per block over all blocks (rank 1st).

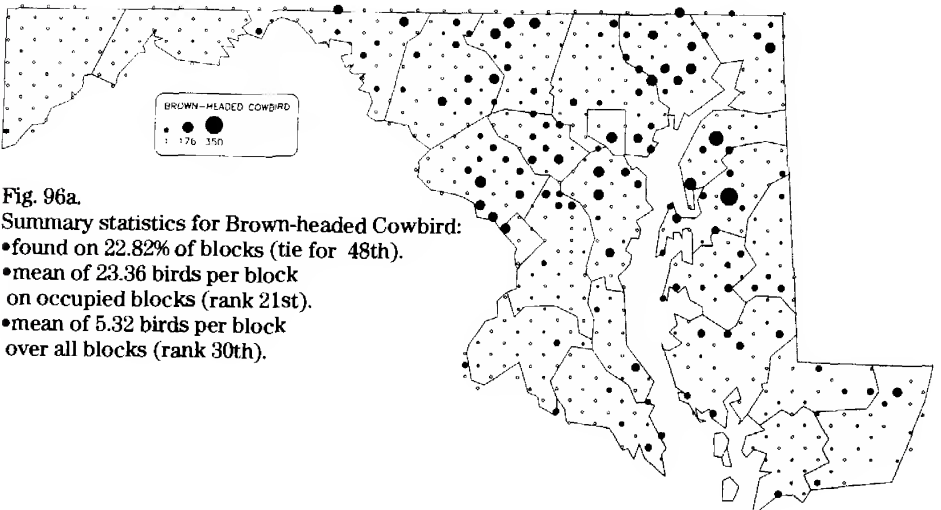


Fig. 96a.

Summary statistics for Brown-headed Cowbird:

- found on 22.82% of blocks (tie for 48th).
- mean of 23.36 birds per block on occupied blocks (rank 21st).
- mean of 5.32 birds per block over all blocks (rank 30th).

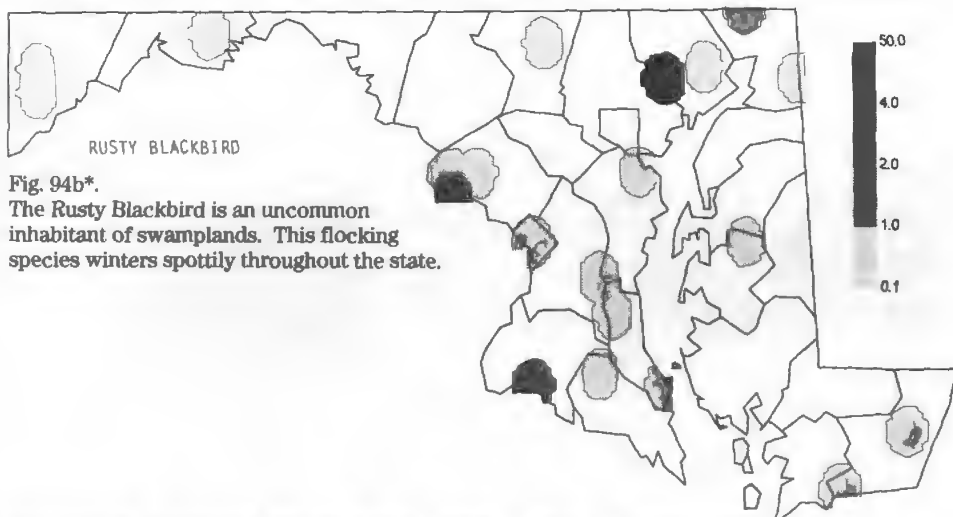


Fig. 94b*.
The Rusty Blackbird is an uncommon inhabitant of swamplands. This flocking species winters spottily throughout the state.

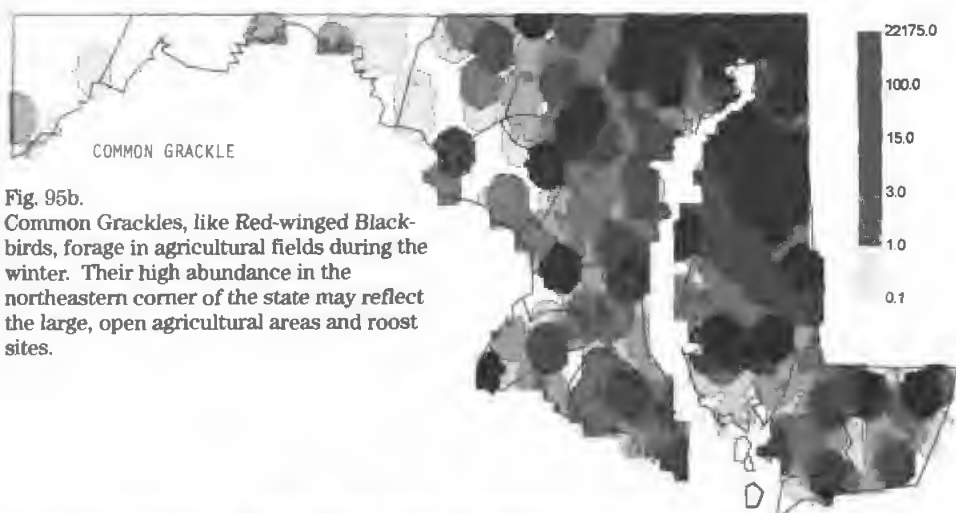


Fig. 95b.
Common Grackles, like Red-winged Blackbirds, forage in agricultural fields during the winter. Their high abundance in the northeastern corner of the state may reflect the large, open agricultural areas and roost sites.

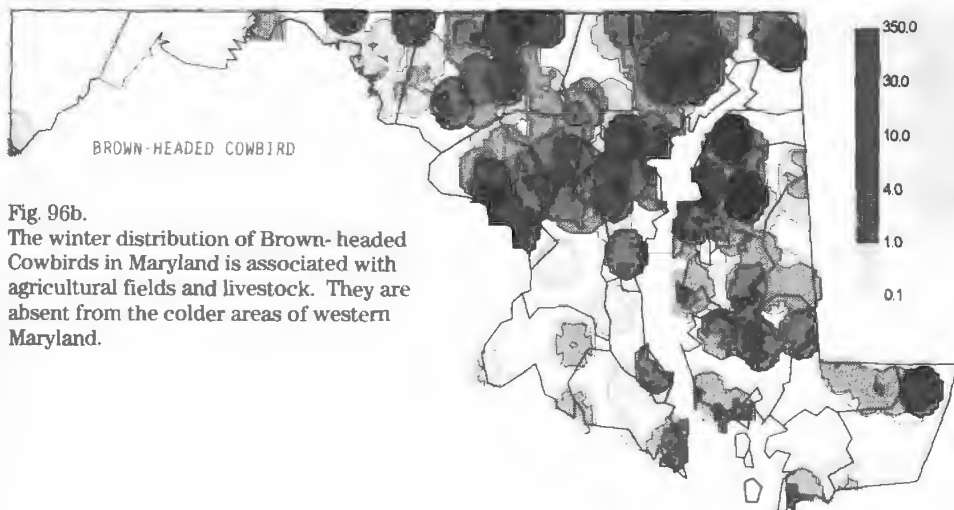


Fig. 96b.
The winter distribution of Brown-headed Cowbirds in Maryland is associated with agricultural fields and livestock. They are absent from the colder areas of western Maryland.

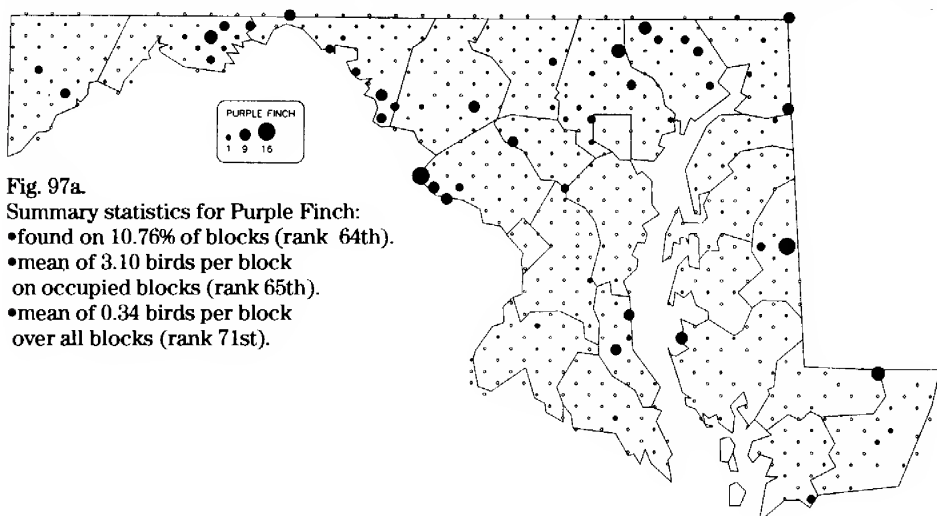


Fig. 97a.

Summary statistics for Purple Finch:

- found on 10.76% of blocks (rank 64th).
- mean of 3.10 birds per block on occupied blocks (rank 65th).
- mean of 0.34 birds per block over all blocks (rank 71st).

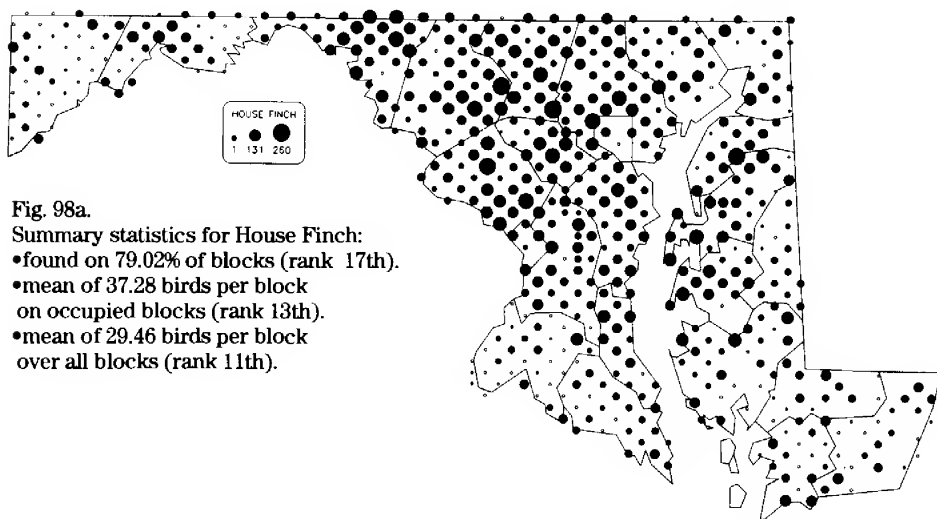


Fig. 98a.

Summary statistics for House Finch:

- found on 79.02% of blocks (rank 17th).
- mean of 37.28 birds per block on occupied blocks (rank 13th).
- mean of 29.46 birds per block over all blocks (rank 11th).

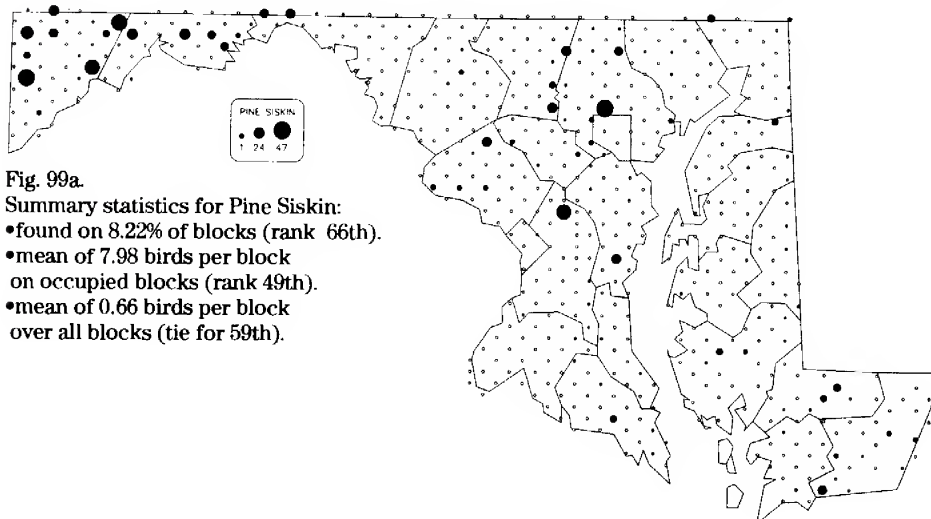


Fig. 99a.

Summary statistics for Pine Siskin:

- found on 8.22% of blocks (rank 66th).
- mean of 7.98 birds per block on occupied blocks (rank 49th).
- mean of 0.66 birds per block over all blocks (tie for 59th).

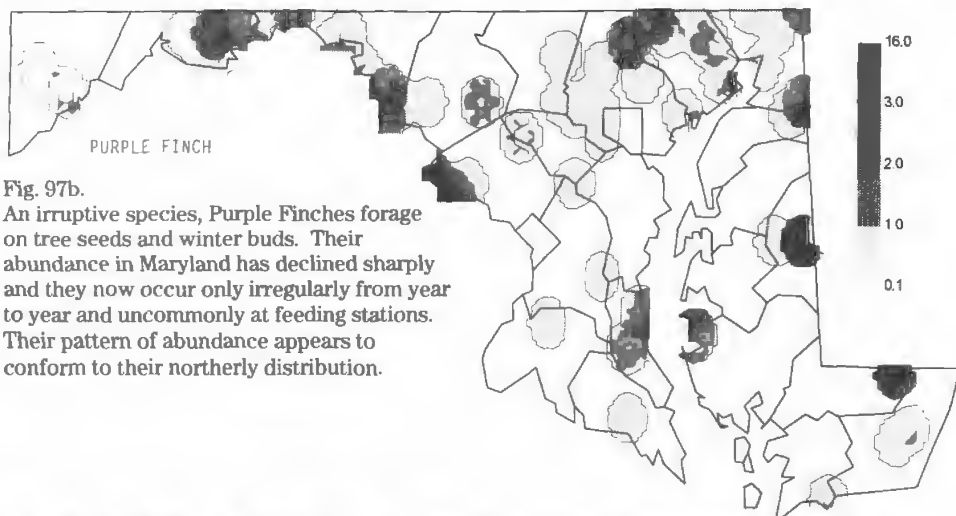


Fig. 97b.

An irruptive species, Purple Finches forage on tree seeds and winter buds. Their abundance in Maryland has declined sharply and they now occur only irregularly from year to year and uncommonly at feeding stations. Their pattern of abundance appears to conform to their northerly distribution.



Fig. 98b.

The House Finch invaded Maryland from the north in the 1960s and is concentrated in suburban areas where it relies heavily on sunflower and thistle feeders at feeding stations. Still expanding southward, it is most abundant in the urbanized corridor at the center of the state.

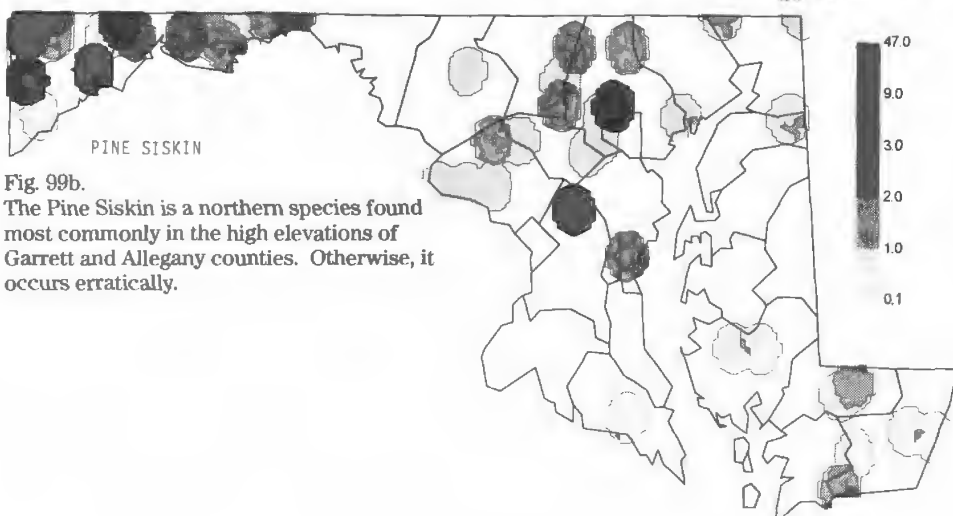


Fig. 99b.

The Pine Siskin is a northern species found most commonly in the high elevations of Garrett and Allegany counties. Otherwise, it occurs erratically.

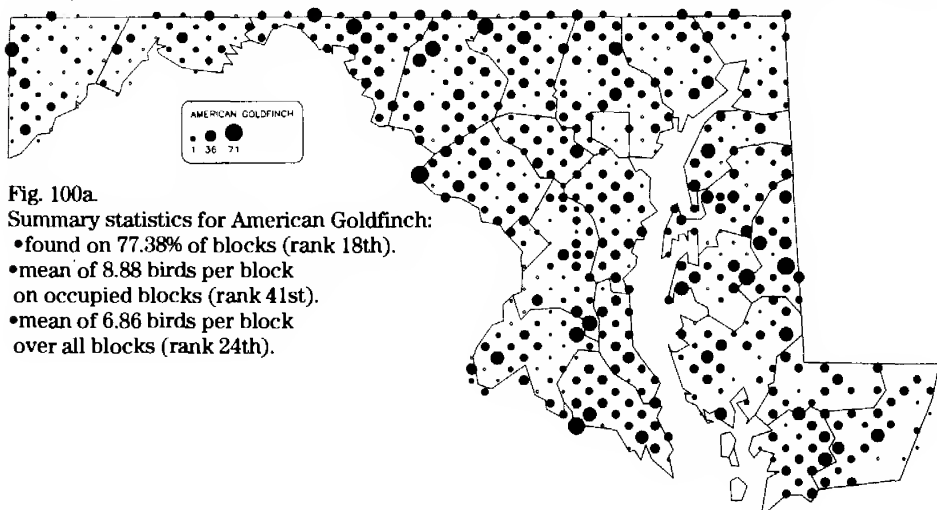


Fig. 100a.

Summary statistics for American Goldfinch:

- found on 77.38% of blocks (rank 18th).
- mean of 8.88 birds per block on occupied blocks (rank 41st).
- mean of 6.86 birds per block over all blocks (rank 24th).

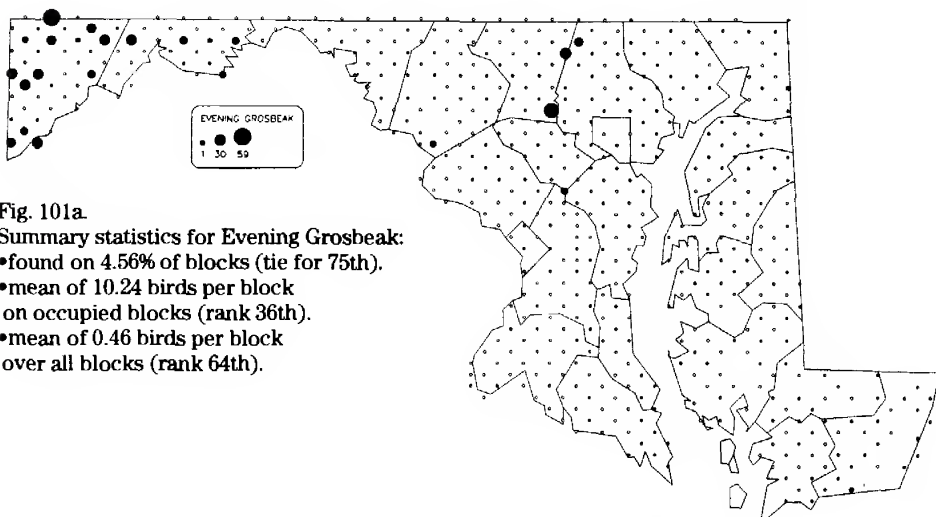


Fig. 101a.

Summary statistics for Evening Grosbeak:

- found on 4.56% of blocks (tie for 75th).
- mean of 10.24 birds per block on occupied blocks (rank 36th).
- mean of 0.46 birds per block over all blocks (rank 64th).

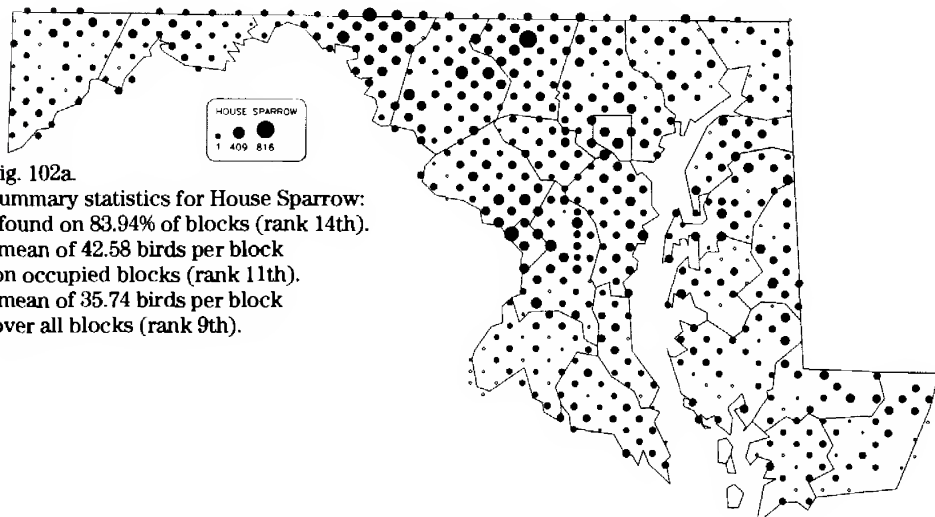


Fig. 102a.

Summary statistics for House Sparrow:

- found on 83.94% of blocks (rank 14th).
- mean of 42.58 birds per block on occupied blocks (rank 11th).
- mean of 35.74 birds per block over all blocks (rank 9th).

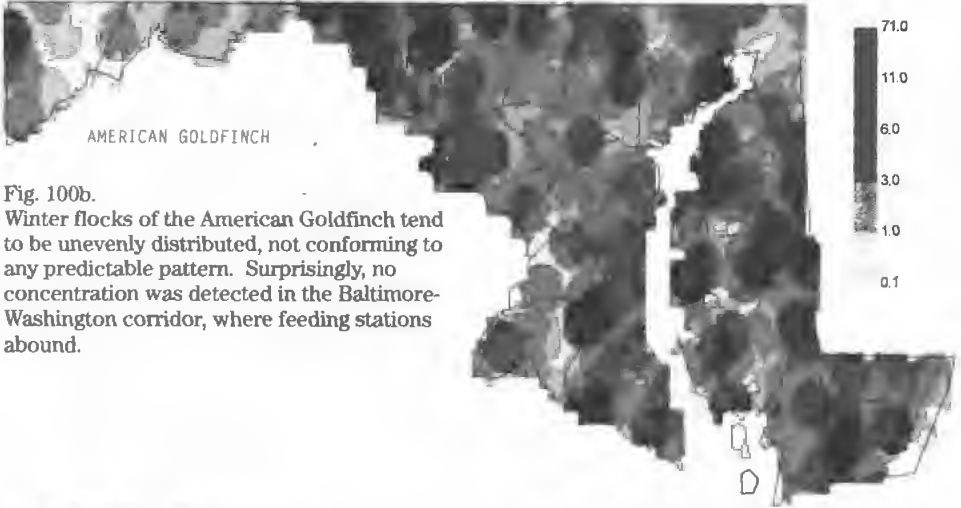


Fig. 100b.
Winter flocks of the American Goldfinch tend to be unevenly distributed, not conforming to any predictable pattern. Surprisingly, no concentration was detected in the Baltimore-Washington corridor, where feeding stations abound.

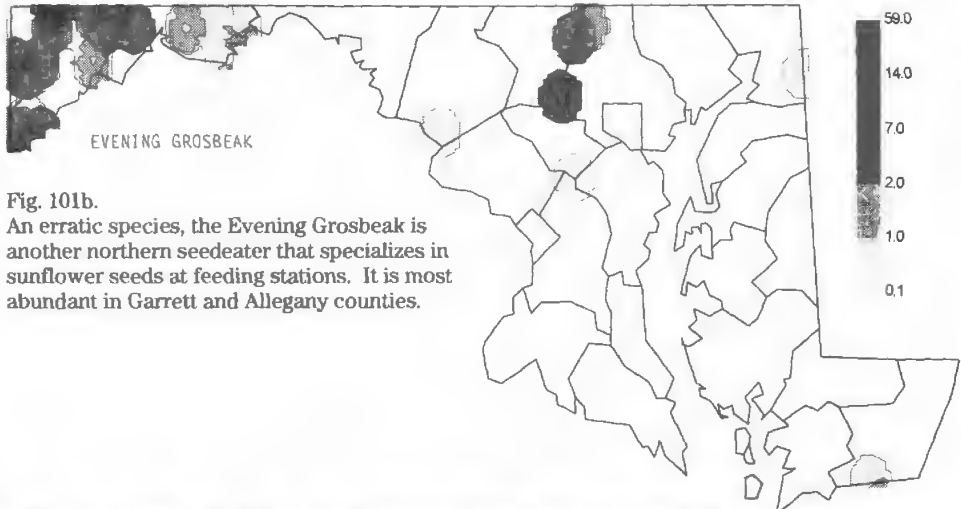


Fig. 101b.
An erratic species, the Evening Grosbeak is another northern seedeater that specializes in sunflower seeds at feeding stations. It is most abundant in Garrett and Allegany counties.

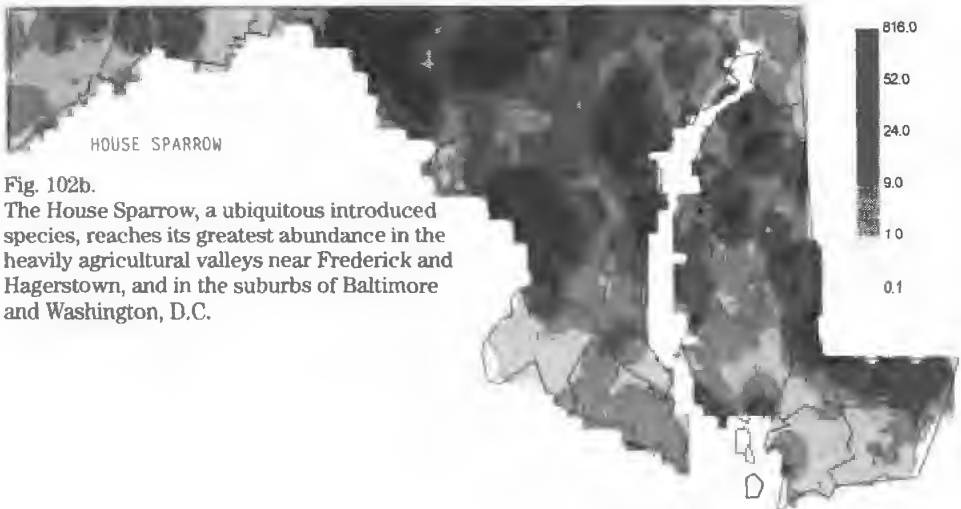


Fig. 102b.
The House Sparrow, a ubiquitous introduced species, reaches its greatest abundance in the heavily agricultural valleys near Frederick and Hagerstown, and in the suburbs of Baltimore and Washington, D.C.

Table 1. Species detected on fewer than 10 blocks during the winter bird survey. Also shown are number of blocks (N), mean abundance per 4-hour survey on occupied blocks (blocks where the species was detected), mean abundance per 4-hour survey over all blocks, and the location (county or Washington, D.C.) of blocks where each species was detected.

| Species | N | <u>Mean Abundance</u> | | Location ¹ |
|---------------------------|---|-----------------------|---------------|-----------------------|
| | | Occupied Blocks | All Blocks | |
| Red-throated Loon | 2 | 4.00 | 0.0146 | 23 |
| Common Loon | 4 | 6.25 | 0.0456 | 9, 19, 23 |
| Pied-billed Grebe | 5 | 3.00 | 0.0274 | 2, 8, 9, 21, 24 |
| Horned Grebe | 8 | 3.38 | 0.0503 | 9, 20, 23, 24 |
| Northern Gannet | 4 | 7.50 | 0.0547 | 9, 18, 23 |
| Double-crested Cormorant | 2 | 16.50 | 0.0602 | 8 |
| Great Egret | 1 | 1.00 | 0.0018 | 2 |
| Black-crowned Night-Heron | 4 | 2.75 | 0.0201 | 19, 23, 24 |
| Ross' Goose | 2 | 1.00 | 0.0036 | 23 |
| Brant | 2 | 107.00 | 0.3905 | 23 |
| Green-winged Teal | 6 | 7.17 | 0.0785 | 2, 10, 14, 19, 22 |
| Northern Pintail | 5 | 5.00 | 0.0456 | 9, 14, 23 |
| Northern Shoveler | 2 | 1.50 | 0.0055 | 3, 14 |
| Gadwall | 6 | 5.83 | 0.0639 | 4, 9, 19, 23 |
| Lesser Scaup | 3 | 10.33 | 0.0566 | 8, 19, 22 |
| Oldsquaw | 7 | 3.57 | 0.0456 | 9, 23 |
| Surf Scoter | 1 | 1.00 | 0.0018 | 23 |
| Ruddy Duck | 5 | 724.00 | 6.6058 | 4, 8, 9, 13, 14 |
| Northern Goshawk | 2 | 1.00 | 0.0036 | 6, 14 |
| Rough-legged Hawk | 5 | 1.60 | 0.0146 | 9, 11, 16, 19 |
| Virginia Rail | 2 | 4.00 | 0.0146 | 9 |
| American Coot | 3 | 22.00 | 0.1204 | 3, 23 |
| Black-bellied Plover | 2 | 35.00 | 0.1277 | 23 |
| Greater Yellowlegs | 5 | 4.60 | 0.0420 | 3, 19, 23 |
| Lesser Yellowlegs | 1 | 2.00 | 0.0036 | 9 |
| Sanderling | 4 | 92.75 | 0.6770 | 18, 23 |
| Dunlin | 1 | 790.00 | 1.4416 | 23 |
| Long-billed Dowitcher | 1 | 4.00 | 0.0073 | 19 |
| American Woodcock | 9 | 1.11 | 0.0182 | 8, 9, 10, 11, 20, 23 |
| Bonaparte's Gull | 3 | 1.00 | 0.0055 | 5, 8, 18 |
| Thayer's Gull | 1 | 1.00 | 0.0018 | 3 |
| Lesser Black-backed Gull | 2 | 1.00 | 0.0036 | 2, 6 |
| Eastern Screech-Owl | 4 | 1.00 | 0.0073 | 5, 16, 19, 21 |
| Short-eared Owl | 2 | 1.00 | 0.0036 | 10, 23 |
| Northern Saw-whet Owl | 1 | 1.00 | 0.0018 | 15 |
| Tree Swallow | 1 | 60.00 | 0.1095 | 23 |
| House Wren | 2 | 1.00 | 0.0036 | 19 |
| Marsh Wren | 6 | 1.17 | 0.0128 | 9, 18, 23 |
| Northern Shrike | 1 | 1.00 | 0.0018 | 7 |
| Orange-crowned Warbler | 2 | 1.00 | 0.0036 | 3, 19 |
| Black-and-white Warbler | 1 | 1.00 | 0.0018 | 18 |
| Common Yellowthroat | 5 | 1.00 | 0.0091 | 2, 3, 10, 14, 18 |
| Indigo Bunting | 1 | 1.00 | 0.0018 | 22 |

| | | | | |
|---------------------|---|------|--------|----------------|
| Vesper Sparrow | 3 | 1.67 | 0.0091 | 18, 22, 23 |
| Lincoln's Sparrow | 2 | 1.00 | 0.0036 | 22, 23 |
| Lapland Longspur | 4 | 4.50 | 0.0328 | 12, 14, 19, 23 |
| Snow Bunting | 3 | 3.00 | 0.0164 | 10, 11, 19 |
| Boat-tailed Grackle | 7 | 3.57 | 0.0456 | 9, 19, 23 |
| Red Crossbill | 2 | 1.50 | 0.0055 | 1, 3 |

¹Counties of Maryland are numbered in alphabetical order: 1=Allegany, 2=Anne Arundel, 3=Baltimore, 4=Calvert, 5=Caroline, 6=Carroll, 7=Cecil, 8=Charles, 9=Dorchester, 10=Frederick, 11=Garrett, 12=Harford, 13=Howard, 14=Kent, 15=Montgomery, 16=Prince George's, 17=Queen Anne's, 18=Saint Mary's, 19=Somerset, 20=Talbot, 21=Washington, 22=Wicomico, 23=Worcester. Washington, D.C. is numbered 24.

Literature Cited

- American Ornithologists' Union. 1983. Check-list of North American birds. 6th ed. Am. Ornithol. Union, Washington, D.C. 877 pp.
- Bystrak, D. and C.S. Robbins. 1972. Winter bird survey, 1972. *Maryland Birdlife* 28(1):15-24.
- Frese, D.P. 1994. *Maryland Manual 1994-1995: A guide to Maryland State Governments*. State Archives of Maryland, Annapolis.
- Hatfield, J.S, S.A. Ricciardi, G.A. Gough, D. Bystrak, and S. Droege. In Prep. An evaluation and comparison of the Maryland winter bird survey and the Audubon Christmas Bird Count for monitoring the distribution and abundance of birds wintering in Maryland.
- Isaaks, E.H. and R.M. Srivastava. *Applied geostatistics*. Oxford University Press, Oxford. 561 pp.
- Robbins, C.S. 1970. Winter bird survey technique tested in Maryland. *Maryland Birdlife* 26(1):11-20.
- Robbins, C.S. 1971. Winter bird survey of central Maryland. *Maryland Birdlife* 27(1):31-38.
- Stewart, R. E., and C. S. Robbins. 1958. *Birds of Maryland and the District of Columbia*. North Am. Fauna 62, U.S. Dept. of Interior, Washington, D.C. 401 pp.

Appendix

Field Sheet

| | | | | | | | |
|--------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| QUAD NAME | | BACK LOCAT. | | OBS. NAME | | DATE | |
| SPECIES | 0110-0900 1 | 0900-0810 2 | 0810-0700 3 | 0700-0510 4 | 0510-0400 5 | 0400-0310 6 | 0310-0200 7 |
| | | | | | | | 0200-0130 8 |
| | | | | | | | |
| | | | | | | | |

WINTER BIRD SURVEY INSTRUCTIONS

GOAL: To survey in a uniform manner the wintering bird life of Maryland. After an initial 6-year survey period, we will develop winter range and relative abundance maps for diurnal wintering birds. In subsequent decades this technique will be used to monitor fluctuations, trends, and cycles in populations. It may also serve to monitor emigrations of unpredictable northern species.

METHODS: Maryland has been divided into a grid of approximately 1200 blocks, each about 10 sq. mi. in size. This is the same grid system used in the Maryland Breeding Bird Atlas project. Each surveyed block will receive 4-hours of on-foot coverage by experienced birders. Due to the difficulties of attempting to survey all 1200+ blocks, only 1/2 the blocks will be covered, namely a checkerboard pattern of "target" blocks. In the first year, alternate southern blocks in each 7 1/2 minute quadrangle will be surveyed during the first year, in the second year, middle blocks and in the third year, northern blocks. The cycle will then repeat in the 4th, 5th, and 6th years, to complete the targeted blocks.

CHOOSING A ROUTE: It is important to cover a block in proportion to the habitats present in the block. For example, if the block contains 40% suburbs, 10% marsh, 10% fields, and 40% woods you should spend about 1 1/2 hours in the suburbs and in the woods and about 1/2 hour in the marsh and in the fields. Most blocks can meet this criterion with one continuous 4-hour route. However, if the habitats present are too scattered, some driving is permitted. Do not exceed 1/2 hour of driving time and do not count birds during that time or consider it part of the total 4 hours. It might also be necessary to retrace part of your route to sample an important habitat. Again, the time spent retracing should not be considered part of the 4 hours, nor should birds be counted. A walking speed of 1-1.5 miles per hour is suggested. Hence, 4 hours of coverage should be about 4-6 miles. This speed allows time to "work" mixed flocks of birds, but not to dawdle or sit. Complete roadside coverage is not recommended, but in some blocks it might be necessary. If a block dictates largely or entirely walking on roads, it will probably be easy to cover up to 6 miles. If you complete 4 hours of coverage before you complete your proposed route, stop counting and return to your car. If you reach your proposed end point before the 4 hours is up, extend coverage, but not along the already-covered route. If possible, examine the map and scout the area ahead of time, asking permission if necessary. Plan your route before the actual day of coverage.

TIMING OF ROUTES: In order to keep the surveys comparable, a time period of 7:30-11:30 has been chosen. This avoids the brief period of intense bird activity at dawn, and everyone gets to sleep later. The survey can be extended up till noon to compensate for driving time, as described above.

COUNTING: Each block will be visited once by one observer. A companion may act as recorder but should not help lure or spot birds. Pishing may be used to attract mixed flocks but no tapes or owl imitations are permitted. The object is not to maximize the number of birds recorded, but to survey winter birds in a uniform manner. Use the field sheet provided, counting all individual birds seen or heard in each of 8 half-hour segments. If you would rather not carry a clip board, a small note pad, with a page for each 1/2 hour will be satisfactory. In blocks with water, time should not be spent scoping or waiting for birds. Open water or other special habitats like landfills should be surveyed following the 4 hours of foot coverage. The results from these special areas should be written in at the bottom of the form. Waterbirds flying over or in fields found during the walking portion of the survey should be treated like any other species. Upon completion of your survey be sure to record all weather information and mark the location of the route you took on the map. Also be sure to mark the location of the end point of each 1/2 hour segment.

GENERIC SPECIES: Winter birds are often difficult to identify to species. For completeness sake, please record all birds such as crows and gulls that you are not able to separate by species.

REPORTING: After completing the count, transfer the data to the summary sheet provided, and fill in the weather data. Total the 8 columns and double-check the species total for each column to make sure it agrees with the species total for each half-hour on the field sheet. Please return your field sheets and maps. These maps are from a personal collection and their replacement is expensive.

WEATHER CODES: Please record the percentage of ground that is covered with snow and the percentage of ice on the water bodies in your block. Please record wind speed using the following codes: 0 - smoke rises vertically, 1 - smoke drifts, 2 - wind felt on face, 3 - light flags extended, 4 - wind raises dust and loose paper, 5 - crested wavelets on inland waters. Please record sky conditions using the following Weather Bureau codes: 0 - Clear or a few clouds, 1 - Partly cloudy (scattered), 2 - cloudy, 4 - fog or smoke, 5 - Drizzle, 7 - Snow, 8 - Showers

A FEW PRACTICAL HINTS:

If there is snow on the ground wear waterproof boots.

Dress in layers and bring 2 more layers than you think you could possibly need.

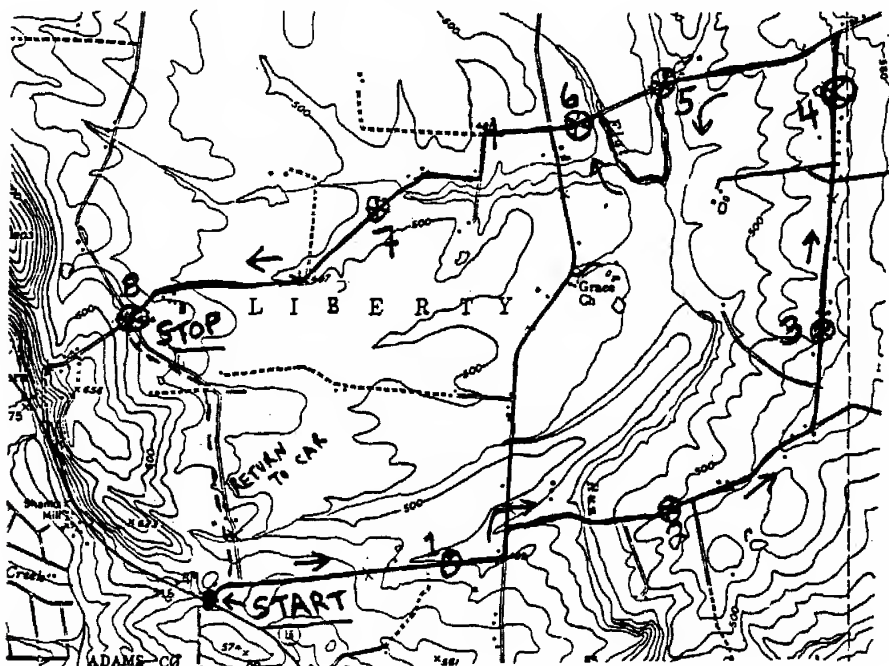
Bring Chapstick.

A pocketful of "trail mix" can keep your energy and spirits high while walking those boring fields.

Two observers can easily survey different blocks using one car by establishing pickup locations along a road at the end of the count.

SAMPLE MAP

showing how to mark your route
and 1/2-hour points



Sample Letter To Observers

WINTER BIRD SURVEY



November 13, 1992

Dear

We've made it! To the last year of the Winter Bird Survey, that is. I'm hoping you'll want to participate this final year so that we can be assured of a data set that will truly represent the whole state.

This year we will be making a second sweep through northern blocks in the USGS quadrangles that overlay the state. In 1990 we visited those blocks for the first time and surveyed 95 of them. That was a great effort, but nonetheless there are still over 100 blocks remaining and this is our last chance to do them. Priorities for coverage have been established. Of highest priority are 67 blocks which, if not surveyed, will leave serious gaps in our data collection. Of these, 27 have been singled out as absolutely essential for coverage. Of next priority are the remaining targeted blocks. In many urban areas, all the targeted blocks have already been surveyed. You will see from the block listing on the reverse side that our critical needs are in Garrett, Allegany, Washington, Carroll, Kent, Dorchester and Wicomico counties. We hope you will make the extra effort to travel farther this year so that all the blocks will be covered. However, you might also consider those northern blocks which have not been targeted. In other words, we would be delighted if you would do a non-targeted northern block rather than none at all.

Would you please fill out the enclosed form and return it to me by December 17? As before, I will do my best to give you the blocks of your choice, but that will not always be possible. Also, please do not opt for a priority block unless you feel very sure that you can complete it. I plan to send you your block assignments by the middle of December. At that time you will receive detailed instructions, the field and reporting sheets and any needed maps. A brief description of the project is given below and a summary of the first five years' worth of data will appear in the November-December issue of the Yellowthroat.

If you any questions, please do not hesitate to call me at 410-647-9513. I again extend my sincere appreciation to all those who have participated in the past.

Sincerely,

Sue Ricciardi, Coordinator
1132 Ferber Avenue
Arnold, MD 21012

Description of Project: The goal is to develop winter range and relative abundance maps for diurnal wintering birds. Maryland has been divided into a checkerboard grid of blocks (same as those used in the Breeding Bird Atlas). Each targeted block will be surveyed once by one observer on foot from 7:30 to 11:30 a.m. between January 10 and February 10. The walking route of approximately 4 1/2 miles is chosen in proportion to the habitats present.

Summary Sheet

| | | | | | | | |
|---------------|--------|--------------------|-----|-------|-----|------|--------------------|
| Quadrant/area | number | Block (circle one) | no. | month | Day | Year | WINTER BIRD SURVEY |
| | | NW NE CW SE | | | | | |

| | | | | | | | | |
|-----|------|-----------|------------|------|-----|------|-------|------------|
| Lat | Long | Elevation | START Time | Temp | Sky | Wind | % ICE | IN or SNOW |
| | | | END Time | Temp | Sky | Wind | | |

| Multi-species counts | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | Total | Multi-species counts | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | Total |
|----------------------|---|---|---|---|---|---|---|---|-------|----------------------|---|---|---|---|---|---|---|---|-------|
| G B HERON | | | | | | | | | | H THRUSH | | | | | | | | | |
| TUNDRA SWAN | | | | | | | | | | ROBIN | | | | | | | | | |
| SNOW GOOSE | | | | | | | | | | CATBIRD | | | | | | | | | |
| CAN GOOSE | | | | | | | | | | MOCKINGBIRD | | | | | | | | | |
| WOOD DUCK | | | | | | | | | | THRASHER | | | | | | | | | |
| BLACK DUCK | | | | | | | | | | PIBIT | | | | | | | | | |
| MALLARD | | | | | | | | | | WAXWING | | | | | | | | | |
| COMMON MERG | | | | | | | | | | STARLING | | | | | | | | | |
| B VULTURE | | | | | | | | | | MYRTLE WARB | | | | | | | | | |
| T VULTURE | | | | | | | | | | PINE WARBLE | | | | | | | | | |
| BALD EAGLE | | | | | | | | | | CARDINAL | | | | | | | | | |
| HARRIER | | | | | | | | | | TOWHEE | | | | | | | | | |
| SHARP-SHIN | | | | | | | | | | TREE SPARO | | | | | | | | | |
| COOPER'S H | | | | | | | | | | FIELD SPARO | | | | | | | | | |
| RED-SHOULDR | | | | | | | | | | SAVANNAH SP | | | | | | | | | |
| RED-TAIL H | | | | | | | | | | FOX SPARROW | | | | | | | | | |
| KESTREL | | | | | | | | | | SONG SPARO | | | | | | | | | |
| PHEASANT | | | | | | | | | | SWAMP SPARO | | | | | | | | | |
| GROUSE | | | | | | | | | | W T SPARROW | | | | | | | | | |
| TURKEY | | | | | | | | | | W C SPARROW | | | | | | | | | |
| BOBWHITE | | | | | | | | | | JUNCO | | | | | | | | | |
| KILLDEER | | | | | | | | | | SNOW BUNTING | | | | | | | | | |
| SNIFE | | | | | | | | | | REDWING B | | | | | | | | | |
| R B GULL | | | | | | | | | | MEADOWLARK | | | | | | | | | |
| H GULL | | | | | | | | | | RUSTY BBIRD | | | | | | | | | |
| G B B GULL | | | | | | | | | | C GRACKLE | | | | | | | | | |
| ROCK DOVE | | | | | | | | | | COWBIRD | | | | | | | | | |
| MOURNING D | | | | | | | | | | PURPL FINCH | | | | | | | | | |
| KINGFISHER | | | | | | | | | | HOUSE FINCH | | | | | | | | | |
| R H WPECKER | | | | | | | | | | SISKIN | | | | | | | | | |
| R B WPECKER | | | | | | | | | | GOLDFINCH | | | | | | | | | |
| SAPSUCKER | | | | | | | | | | GROSBEAK | | | | | | | | | |
| DOWNY WPKR | | | | | | | | | | HOUSE SPARO | | | | | | | | | |
| HAIRY WPKR | | | | | | | | | | | | | | | | | | | |
| FUCKER | | | | | | | | | | | | | | | | | | | |
| PILEATED WP | | | | | | | | | | | | | | | | | | | |
| PHOEBE | | | | | | | | | | | | | | | | | | | |
| HORNED LARK | | | | | | | | | | | | | | | | | | | |
| JAY | | | | | | | | | | TOTALS | | | | | | | | | |
| AM CROW | | | | | | | | | | NO. OF SPECIES | | | | | | | | | |
| FISH CROW | | | | | | | | | | | | | | | | | | | |
| RAVEN | | | | | | | | | | | | | | | | | | | |
| B C CHICKDE | | | | | | | | | | | | | | | | | | | |
| C CHICKADEE | | | | | | | | | | | | | | | | | | | |
| TITMOUSE | | | | | | | | | | | | | | | | | | | |
| R B NUTHCH | | | | | | | | | | | | | | | | | | | |
| W B NUTHCH | | | | | | | | | | | | | | | | | | | |
| B H NUTHCH | | | | | | | | | | | | | | | | | | | |
| CREEPER | | | | | | | | | | | | | | | | | | | |
| CAR WREN | | | | | | | | | | | | | | | | | | | |
| WINTER WREN | | | | | | | | | | | | | | | | | | | |
| G C KINGLET | | | | | | | | | | | | | | | | | | | |
| R C KINGLET | | | | | | | | | | | | | | | | | | | |
| BLUEBIRD | | | | | | | | | | | | | | | | | | | |

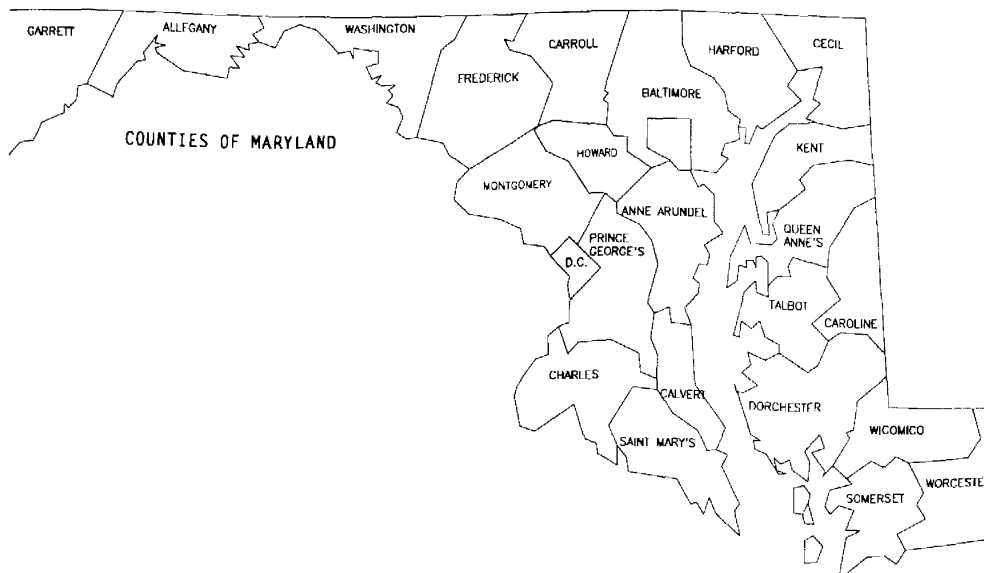
SUMMARY SHEET

RETURN THIS SUMMARY SHEET, YOUR FIELD SHEET, AND THEM MAP WITH YOUR ROUTE MARKED ON IT BY FEB. 28 TO RIJE RICCIARDI 1132 FERRER AVE. ARNOLD MD 21012

SUMMARY SHEET

Index to Map Numbers

| | | | |
|----|----------------------------------|-----|----------------------------|
| 2 | Great Blue Heron | 53 | American+Crow species |
| 3 | Tundra Swan | 54 | Fish Crow |
| 4 | Mute Swan | 55 | American+Fish+Crow species |
| 5 | Snow Goose | 56 | Northern Raven |
| 6 | Canada Goose | 57 | Black-capped Chickadee |
| 7 | Wood Duck | 58 | Carolina Chickadee |
| 8 | American Black Duck | 59 | Tufted Titmouse |
| 9 | Mallard | 60 | Red-breasted Nuthatch |
| 10 | American Wigeon | 61 | White-breasted Nuthatch |
| 11 | Canvasback | 62 | Brown-headed Nuthatch |
| 12 | Ring-necked Duck | 63 | Brown Creeper |
| 13 | Common Goldeneye | 64 | Carolina Wren |
| 14 | Bufflehead | 65 | Winter Wren |
| 15 | Hooded Merganser | 66 | Golden-crowned Kinglet |
| 16 | Common Merganser | 67 | Ruby-crowned Kinglet |
| 17 | Red-breasted Merganser | 68 | Eastern Bluebird |
| 18 | Black Vulture | 69 | Hermit Thrush |
| 19 | Turkey Vulture | 70 | American Robin |
| 20 | Bald Eagle | 71 | Gray Catbird |
| 21 | Northern Harrier | 72 | Northern Mockingbird |
| 22 | Sharp-shinned Hawk | 73 | Brown Thrasher |
| 23 | Cooper's Hawk | 74 | American Pipit |
| 24 | Red-shouldered Hawk | 75 | Cedar Waxwing |
| 25 | Red-tailed Hawk | 76 | European Starling |
| 26 | American Kestrel | 77 | Yellow-rumped Warbler |
| 27 | Ring-necked Pheasant | 78 | Pine Warbler |
| 28 | Ruffed Grouse | 79 | Palm Warbler |
| 29 | Wild Turkey | 80 | Northern Cardinal |
| 30 | Northern Bobwhite | 81 | Rufous-sided Towhee |
| 31 | Killdeer | 82 | American Tree Sparrow |
| 32 | Common Snipe | 83 | Chipping Sparrow |
| 33 | Ring-billed Gull | 84 | Field Sparrow |
| 34 | Herring Gull | 85 | Savannah Sparrow |
| 35 | Herring+Ring-billed+Gull species | 86 | Fox Sparrow |
| 36 | Great Black-backed Gull | 87 | Song sparrow |
| 37 | Rock Dove | 88 | Swamp Sparrow |
| 38 | Mourning Dove | 89 | White-throated Sparrow |
| 39 | Great Horned Owl | 90 | White-crowned Sparrow |
| 40 | Barred Owl | 91 | Dark-eyed Junco |
| 41 | Belted Kingfisher | 92 | Red-winged Blackbird |
| 42 | Red-headed Woodpecker | 93 | Eastern Meadowlark |
| 43 | Red-bellied Woodpecker | 94 | Rusty Blackbird |
| 44 | Yellow-bellied Sapsucker | 95 | Common Grackle |
| 45 | Downy Woodpecker | 96 | Brown-headed Cowbird |
| 46 | Hairy Woodpecker | 97 | Purple Finch |
| 47 | Northern Flicker | 98 | House Finch |
| 48 | Pileated Woodpecker | 99 | Pine Siskin |
| 49 | Eastern Phoebe | 100 | American Goldfinch |
| 50 | Horned Lark | 101 | Evening Grosbeak |
| 51 | Blue Jay | 102 | House Sparrow |
| 52 | American Crow | | |



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Editor: Chandler S. Robbins, 7900 Brooklyn Bridge Rd., Laurel, MD 20707 (301-725-1176)
Assoc. Editor: Robert F. Ringler, 6272 Pinyon Pine Court, Eldersburg, MD 21784
Asst. Editors: Mark Hoffman, 313 Fernwood Drive, Severna Park, MD 21014
 James Stasz, P.O. Box 71, North Beach, MD 20714
Mailing: Howard County Chapter
Headings: Schneider Design Associates, Baltimore

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